P-78

NASA Technical Memorandum 4283

Microgravity Science and Applications Bibliography

1990 Revision

MAY 1991

NASA Technical Memorandum 4283

Microgravity Science and Applications Bibliography

1990 Revision

NASA Office of Space Science and Applications
Washington, D.C.

NASA

National Aeronautics and Space Administration

Office of Management

Scientific and Technical Information Division

1991

CONTENTS

FOREWARD

This edition of the Microgravity Science and Applications (MSA) Bibliography is a comprehensive compilation of government reports, contractor reports, conference and symposia proceedings, and journal articles dealing with flight experiments utilizing a low-gravity environment to elucidate and control various processes, and with ground-based activities that provide supporting research. It encompasses literature published but not cited in the 1989 Revision, literature published during 1989, and literature either submitted for publication or in press.

Most papers are on file and copies can be made available to scientists in the field on request to the bibliographer.

Any omissions that might have occurred are sincerely regretted. Investigators are encouraged to submit to the bibliographer, information on any work that was inadvertently omitted, or any new work, for inclusion in next year's edition of the Bibliography. All correspondence concerning corrections, additions, or deletions to the Microgravity Science and Applications Bibliography should be directed to: Ms. Elizabeth Pentecost, USRA, Suite 303, 600 Maryland Ave., SW, Washington, DC 20024.

The Microgravity Science and Applications Division wishes to thank the Universities Space Research Association (USRA) and in particular Ms. Elizabeth Pentecost, for her efforts in the compilation and publication of this report.

A. U.S. PROGRAM

MICROGRAVITY SCIENCE AND APPLICATIONS PROGRAM

Electronic Materials

Abdeljakiem, W., Patterson, J.D., and Lehoczky, S.L., "A Comparison Between Electron Mobility in N-type $Hg_{1-x}Cd_xTe$ and $Hg_{1-x}Zn_xTe$," Mat. Lett., 1991 (in press).

Alexander, J.I.D., Ouazzani, J., and Rosenberger, F., "Analysis of the Low Gravity Tolerance of Bridgman-Stockbarger Growth, I. Steady and Impulse Accelerations," J. Cryst. Growth 97, 285-302 (1989).

Alexiades, V., "Casting of HgCdTe, Part I: Thermophysical Property Value," ORNL Report ONRL/TM-11734.

Alexiades, V., "Casting of HgCdTe, Part II: Conduction-Diffusion Model and its Numerical Implementation," ORNL Report ORNL/TM-11753.

Alexander, J.I.D., Amiroudine, S., Ouazzani, J., and Rosenberger, F., "Analysis of the Low Gravity Tolerance of Bridgman-Stockbarger Crystal Growth II. Transient and Periodic Accelerations," J. Cryst. Growth, December 1990 (submitted).

Alexander, J.I.D., Amiroudine, S., Ouazzani, J., and Rosenberger, F., "A Numerical Analysis of the Sensitivity of Bridgman-Stockbarger Solidification to Steady and Time-Dependent Residual Acceleration," *IUTAM Symposium on Microgravity Fluid Mechanics*, Bremen, 1991, submitted.

Andrews, R. N., Szofran, F. R., and Lehoczky, S. L., "Growth and Characterization of $Hg_{1-x}Cd_xTe$ Alloys," J. Cryst. Growth, 1988 (in press).

Andrews, R.N., Walck, S.D., Price, M.W., Szofran, F.R., Su., C-H., and Lehoczky, S.L., "Microhardness Variations in II-VI Semiconducting Compounds as a Function of Composition," J. Cryst. Growth 99, 717-721 (1990).

Barber, P.G., "Moments of Momenta as Predictors of Molecular Species in Crystal Growth Solutions," J. Cryst. Growth, 1990 (accepted).

Barber, P.J., Berry, R.F., Debham, W.J., Fripp, A.L., Huang, Y., Stacy, K., and Simchick, R.T., "Modeling Melt-Solid Interfaces in Bridgman Growth," J. Cryst. Growth 97, 672-674 (1989).

Barber, P.G. and Petty, J.T., "Use of Moments of Momentum to Predict the Crystal Habit in Potassium Hydrogen Phthalate," J. Cryst. Growth 100, 185-188 (1990).

Barber, P. G., Fripp, A. L., Debnam, W. J., "The Development of Procedures for the Direct Observation of the Location and Shape of the Melt-Solid Interface in the Bridgman Growth of Semiconductors," J. Cryst. Growth 104, 315 (1990).

Bellows, A., Matthiesen, D., and Duchene, G., "Free Float Acceleration Measurements Aboard NASA's KC-135 Microgravity Research Aircraft," *28th` Aerospace Sciences Meeting,* Reno, January 1990, AIAA Paper No. 90-0742.

Brown, R.A. and Kin, D-H., "Modelling of Directional Solidification: from Scheil to Detailed Numerical Simulation," J. Cryst. Growth, 1990 (in press).

Bugajski, M., Ko, K. H., Lagowski, J., and Gatos, H. C., "Native Acceptor Levels in Ga-Rich GaAs," Appl. Phys., 1988 (in press).

Cao, X.Z. and Witt, A.F., "Decorated Dislocations in Si-GaAs as Revealed by Dark Field NIR Transmission Microscopy," J. Cryst. Growth, submitted.

Cao, X.Z. and Witt, A.F., "Identification of Dislocation Etch Pits by NIR Transmission Microscopy," J. Cryst. Growth, in preparation.

Carlson, D.J. and Witt, A.F., "Microsegregation in Conventional Si-Doped LEC GaAs," J. Cryst. Growth 108, 508-518 (1991).

Carlson, D.J. and Witt, A.F., "Quantitative Analysis of the Effects of Vertical Magnetic Fields on Microsegregation in Te-Doped LEC GaAs," J. Cryst. Growth, submitted.

Choi, S.W., Lucovsky, G., and Bachmann, K., "The Kinetics of Plasma Assisted OMCVD of GaN," in *Proceedings of Materials Research Society Meeting*, Boston, 1990, in press.

Cobb, S. D., Andrews, R. N., Szofran, F. R., and Lehoczky, S. L., "Characterization of Directionally Solidified $Hg_{1-x}Zn_xSe$ Alloys," J. Cryst. Growth, 1991 (in press).

Frazier, D.O., Facemire, B.R., Loo, B., Burns, D., and Thiessen, D., "Solidification Behavior of Impurity-Doped Succinonitrile Solutions in High-Surface Area, Low-Bulk Volume Containers," J. Cryst. Growth 106, 101-115 (1990).

Gillies, D.C., Lehoczky, S.L., Sozfran, F.R., Perry, G.L.E., and Su, C-H., "Interface Demarcation in Bridgman-Stockbarger Crystal Growth of II-VI Compounds," Invited Paper, *SPIE Symposium on Growth and Characterization of Materials for Infrared Detectors and Nonlinear Optical Switches*, Orlando, 1991 (submitted).

Gokoglu, S. A., Arnold, W. A., Tsui, P., and Chait, A., "A 2D Analysis for Convection Effects in a CVD Reactor Configured for Deposition on Single Fibers," *Proceedings of the 1990 ASME Winter Annual Meeting*, 1990 (accepted).

Henningsen, T. and Singh, N.B., "Crystal Characterization by Use of Birefringence Interferometry," J. Cryst. Growth 96, 114-118 (1989).

Hirsch, C-H. and Witt, A. F., "Analytical Approach to the Determination of Axial Temperature Gradients in Bridgman System," J. Cryst. Growth, 1989 (submitted).

Hirsch, C-H. and Witt, A. F., "Analytical Approach to the Determination of Growth Interface Mrophologies in Vertical Bridgman Geometry," J. Cryst. Growth, 1989 (submitted).

Huang, Y., Debnam, W. J., and Fripp, A. L., "Interface Shapes During Vertical Bridgman Growth of PbSnTe Crystals," J Cryst. Growth, 1990 (accepted).

Kelliher, J. and Bachmann, K., "Phase Relations and Crystal Growth in the System $CuInTe_2$-MnTe," in *Proceedings of Materials Research Society Meeting*, Boston, 1990, in press.

Kim, D-H. and Brown, R. A., "Transient Simulation of Convection and Solute Segregation of GaAs Growth in a Vertical Gradient Freeze Furnace," J. Cryst. Growth, 1990 (in press).

Kim, D-H. and Brown, R. A., "Modelling of Transients in Growth of HgCdTe by the Vertical Bridgman Technique," J. Cryst. Growth, 1990 (submitted).

Kim, Y. J., and Kou, S., "Thermocapillary Convection in Zone Melting Crystal Growth-An Open-Boat Physical Simulation", J. Cryst. Growth, 1989 (in press).

Knuteson, D.J., Fripp, A. L., Woodell, G., Debham, W.J., and Narayanan, R., "Oscillation Phase Relations in a Bridgman System," J. Cryst. Growth, 1990 (accepted).

Knuteson, D.J., Fripp, A.L., Debham, W.J., and Narayanan, R., "Unsteady Convection in Tin in a Bridgman Configuration," J. Cryst. Growth, 1990 (accepted).

Krishnamurthy, S., Sher, A., Chen-A-B., and Fripp, A. L., "Nucleation Theory - An Improved Entropy," J Cryst. Growth, 1989 (in press).

Lan, C. W., Kim, Y. J., and Kou, S., "A Half-zone Study of Marangoni Convection in Floating-Zone Crystal Growth Under Microgravity", submitted for publication.

Lan, C. W., and Kou, S., "Thermocapillary Flow and Melt/Solid Interfaces in Floating-Zone Crystal Growth Under Microgravity", submitted for publication.

Lan, C. W., and Kou, S., "Thermocapillary Flow and Natural Convection in a Melt Column with an Unknown Melt/Solid Interface", submitted for publication.

Laudise, R.A., Sunder, W.A., Barns, R.L., Kammlott, G.W., Witt, A.F., and Carlson, D.J., "Czochralski Crystal Growth in the System $PtMn_xSb_{2-x}$," J. Cryst. Growth 102, 21-30 (1990).

Lee, C.T., Ramprasad, N., and Brown, R.A., "Two-dimensional Cellular Structures in the Solidification of CBr_4-Br_2: Comparison of Calculations with Experiments," J. Cryst. Growth, 1990 (submitted).

Lehoczky, S. L., Szofran, F. R., Su, C-H., Cobb, S., and Andrews, R. N., "Crystal Growth of Solid Solution Systems by Directional Solidification," in *Proceedings of ASM International '87 Materials Congress*, 1988.

Lehoczky, S.L., "Microgravity Processing of Electronic Materials," Invited Paper, *28th Aerospace Sciences Meeting*, Reno, January 1990.

Matthiesen, D. H., Wargo, M. J., and Witt, A., "Melt Stabilization during Crystal Growth: A Comparative Analysis of the Effectiveness of Magnetic Fields and Reduced Gravity," J. Cryst. Growth, 1988 (in press).

Matthiesen, D. H., Kafalas, J., Duchene, G., and Bellows, A., "Interface Demarcation in GaAs by Current Pulsing," *28th Aerospace Sciences Meeting*, Reno, January 1990, AIAA Paper No. 90-0319.

McKeagney, D., Jordan, L., Andrews, R.N., Walck, S.D., Szofran, F.R., and Lehoczky, S.L., "Influence of Growth Rate on Etch Pit Density of Directionally Solidified $Hg_{1-x}CdTe$ Semiconducting Alloys," in *Proceedings of Ninth International Conference on Crystal Growth*, Sendai, Japan, 1989.

McKeagney, D., Andrews, R.N., Lehoczky, S.L., and Szofran, F.R., "The Microstructural and Defect Characterization of $Hg_{0.8}Cd_{0.2}Te$ as a Function of Growth Rate," *Proceedings of 8th American Conference on Crystal Growth*, Vail, Colorado, 1990 (in press).

Nadarajah, A., Rosenberger, F., and Alexander, J.I.D., "Modelling the Solution Growth of TGS Crystals in Low Gravity," J. Cryst. Growth 104, 218-232 (1990).

Palosz, W. and Wiedemeier, H., "Mass Flux, Crystal Composition, and Solid Solubility Studies of the $Hg_{1-x}Mn_xTe$-HgI_2 Vapor Transport System," J. Less-Common Metals 156, 299 (1989).

Patterson, J.D. and Lehoczky, S.L., "The Second Born Approximation and the Friedel Sum Rule," Phys. Lett. A. 137(3), 137-138 (1989).

Patterson, J.D., Abdelhakiem, W., and Lehoczky, S.L., "Electron Mobility in n-type $Hg_{1-x}Cd$ and $Hg_{1-x}ZnTe$ Alloys," J. App. Phys., 1990 (submitted).

Penn, B.G., Shields, A., and Frazier, D.O., "A Review of Metal and Vapor Growth Techniques for Polydiacetylene Thin Films for Nonlinear Optical Applications," NASA TM-100340, September 1988.

Penn, B.G., Shields, A., and Frazier, D.O., "A Preliminary Review of Organic Materials Single Crystal Growth by the Czochralski Technique," NASA TM-100341, September 1988.

Penn, B., Cardelino, B., Moore, C., Shields, A., and Frazier, D., "Growth of Bulk SIngle Crystals of Organic Materials for Nonlinear Optical Devices: An OVerview," Prog. Cryst. Growth & Charact., in press.

Price, M.W., Andrews, R.N., Su, C-H., Lehoczky, S.L., and Szofran, F.R., "The Effect of a Transverse Magnetic Field on the Directional Solidification of CdTe," *Proceedings of 8th American Conference on Crystal Growth*, Vail, Colorado, 1990 (in press).

Rosch, W. and Carlson, F.M., "Computed Stress Fields in GaAs During Vertical Bridgman Growth," J. Cryst. Growth, 1990 (accepted).

Rosenberger, F., "Fundamentals of Crystal Growth from Vapors," in *Crystal Growth in Science and Technology* (H. Arend and J. Hulliger, eds.), Plenum, 1990, pp. 107-118.

Rosenberger, F., "Boundary Layers in Crystal Growth, Facts and Fancy," in *Lectures on Crystal Growth* (H. Komatsu, ed.), in press.

Rosner, D. E., "Side-wall Gas 'Creep' and 'Thermal' Stress Convection in Microgravity Experiments on Film Growth by Vapor Transport," Phys. Fluids A., 1989.

Sha, Y. G. and Wiedemeier, H., "The Direct Determination of the Vacancy Concentration and P-T Phase Diagram of HgTe by Dynamic Mass Loss Measurements," J. Electronic Materials 19, 159 (1989).

Sha, Y.G., and Wiedemeier, H., "The Direct Determination of the Vacancy Concentration and P-T Phase Diagram of $Hg_{0.8}Zn_{0.2}Te$ by Dynamic Mass-Loss Measurements," J. Electronic Materials, 1990 (in press).

Shields, A.W., Frazier, D.O., and Penn, B., "Growth of Nonlinear Optical Organic Thin Films by Physical Vapor Transport Deposition," ANnual Joint APS/AAPT Meeting, San Francisco, January 1989; Bull. APS 34, 50 (1989). Abstract

Singh, N. B., "Evaluation of Transport Conditions During Vapor Growth of Mercurous Chloride in 1-g Conditions," J. Thermo-Phys. & Heat. Trans. 4, 126-128 (1990).

Singh, N.B., "Mercurous Halides: A New Class of Acousto-Optic and Opto-Electronic Materials," AACG Newsletter 20, 8-11 (1990).

Singh, N.B., "Transport Phenomena during Vapor Growth of Optoelectronic Material: A Mercurous Chloride System," in *Low-Gravity Fluid Dynamics and Transport* (J.N. Koster and R.L. Sani, eds.), AIAA, 1990, pp. 175-180.

Singh, N.B., "Stoichiometric Considerations during Crystal Growth of Mercurous Halides," Mat. Lett., 1990 (in press).

Singh, N.B., Mazelsky, R., and Glicksman, M.E., "Evaluation of Transport Conditions during Physical Vapor Transport Growth of Opto-electronic Crystals," J. Thermophys. 4, 126-128 (1990).

Singh, N.B., Marshall, G., Gottlieb, M., Brandt, G.B., Hopkins, R.H., Mazelsky, R., Duval, W.M.B., and Glicksman, M.E., "Purification and Characterization of Mercurous Halides," J. Cryst. Growth 106, 61-67 (1990).

Singh, N. B., Davies, D. K., Gottlieb, M., and Mazelsky, R., "On the Quality of Mercurous Chloride Crystal," J. Cryst. Growth, 1988 (submitted).

Singh, N.B. and Glicksman, M.E., "Effects of Crystal-Melt Interfacial Energy Anistropy on Dendritic Morphology and Growth Kinetics," J. Cryst. Growth 98, 277 (1989).

Singh, N.B. and Glicksman, M.E., "Free Dendritic Growth in Viscous Melts: Cyclohexanol," Letter to the Editor, J. Cryst. Growth 98, 534 (1989).

Singh, N.B. and Glicksman, M.E., "Physical Properties of Ultra-Pure Pivalic Acid," Thermochimica Acta 159, 93-99 (1990).

Singh, N.B., Rai, U.S., Singh, O.P., and Glicksman, M.E., "Effect of Impurity on the Growth Rates and Morphology of Dendritic Crystals," Mat. Sci. Forum 50, 79-88 (1989).

Singh, N.B., Mazelsky, R., and Glicksman, M.E., "Solidification Behaviour of Organic Nonlinear Optical Crystals," Prog. Crystal Growt and Charact. 17, 265-278 (1989).

Su, C-H., "Growth Rate of CdS by Vapor Transport in a Closed Ampoule," J. Cryst. Growth 80, 333 (1987).

Su, C-H., Lehoczky, S.L., and Szofran, F.R., "Growth and Characterization CdS Crystals," *Fourth International Conference on II-VI Compounds*, West Berlin, 1989.

Su, C-H., Lehoczky, S.L., and Szofran, F.R., "Growth and Characterization of CdS Crystals," J. Cryst. Growth , 221 (1990).

Su, C-H., Lehoczky, S.L., and Szofran, F.R., "An Improved Vapor Growth Method for the Preparation of Electronic and Electro-optical Materials," NASA Tech Brief, in press.

Su, C-H., Lehoczky, S.L., and Szofran, F.R., "Directional Solidification of HgCdTe and HgZnTe in a Transverse Magnetic Field," J. Cryst. Growth, 1991 (in press).

Su, C-H., Lehoczky, S.L., and Szofran, F.R., "Directional Solidification of HgCdTe and HgZnTe in a Transverse Magnetic Field," in *Proceedings of 8th American Conference on Crystal Growth*, Vail, Colorado, 1990 (in press).

Su, C-H., Lehoczky, S.L., Szofran, F.R., Gillies, D.C., and Perry, G.L.E., "Directional Solidification and Casting of HgCdTe in a Transverse Magnetic Field," in *Proceedings of Third European Symposium on Crystal Growth*, Budapest, 1991 (submitted).

Szofran, F.R., Cobb, S.D., Suggs, R.J., and Lehoczky, S.L., "Bandgap as a Function of Temperature and Composition for (Hg,Zn)Se," *1989 March Meeting of the American Physical Society*, St. Louis, 1989; Bull. APS 34(3), 1030 (1989).

Szofran, F.R., Su, C-H., Cobb, S.D., and Lehoczky, S.L., "Convection Effects in the Compositional Redistribution during Solidification of HgZnTe and Related Materials," in *Proceedings of 8th American Conference on Crystal Growth*, Vail, Colorado, 1990 (in press).

Taylor, R. E., Holland, L. R., and Crouch, R. K., "Thermal Diffusivity Measurements of Some Molten Semiconductors," High Temp. High Press., 1988 (in press).

Ungar, L. H. and Brown, R. A., "Finite Element Methods for Unsteady Solidification, Problems Arising in the Prediction of Morphological Structure," J. Sci. Comput., 1988 (in press).

van den Berg, L., "Mercuric Iodide Crystal Growth in Space," Nucl. Instrum. & Meth., 1989 (in press).

van den Berg, L., Skinner, N. L., and Ortale, C., "Charge Carrier Transport Properties of a Mercuric Iodide Crystal Grown in Space," in *Proceedings of IEEE 1989 Nuclear Science Symposium*, 1989 (in press).

Volz, M.P., Szofran, F.R., Lehoczky, S.L., and Su, C-H., "Lattice Vibration Spectra of $Hg_{1-x}Cd_xTe$ Alloys," Solid State Commun. 75(12), 943-947 (1990).

Volz, M.P., Sozfran, F.R., Su, C-H., and Lehoczky, S.L., "Far Infrared Characterization of Directionally Solidified $Hg_{1-x}Cd_xTe$," in *Proceedings of 8th American Conference on Crystal Growth*, Vail, Colorado, 1990 (in press).

Wargo, M.J. and Witt, A.F., "The Use of Thermal Imaging for Diameter Control of LEC-type Crystal Growth, J. Cryst. Growth, submitted.

Wiedemeier, H. and Palosz, W., "Mass Flux and Crystal Composition in the $Hg_{0.8}Cd_{0.2}Te$-HgI_2 Vapor Transport System," J. Cryst. Growth 96, 933 (1989).

Wiedemeier, H. and Ge, Y.R., "Physical Vapor Transport and Crystal Growth of $GeSe_xTe_{1-x}$ Solid Solutions," Z. Anorg. Allg. Chem., 1990 (in press).

Xing, G.C., Bachmann, K.J., Posthill, J.B., and Timmons, M.L., "Substrate Effects on the Properties of $ZnGeP_2$ Epilayers on Si and GaP," J. Appl. Phys., accepted.

Xing, G.C., Posthill, J.B., and Bachmann, K.J., "The Characterization of $ZnSiP_2$-$ZnGeP_2$/GaP Hetrostructures Grown by OMCVD," J. Cryst. Growth, accepted.

Yoo, H-D., Wilcox, W. R., Lal, R. B., and Trolinger, J. D., "Modelling the Growth of Triglycine Sulfate (TGS) Crystals in Spacelab-3," J. Cryst. Growth, submitted.

Metals, Alloys, and Composites

Anderson, C.D., Hofmeister, W.H., Wittig, J.E., Bayuzick, R.J., and Skinner, D.J., "A Microstructural Examination of Ti-50Al and other Binary Ti-Al Alloys that have been Splat-Quenched after Bulk Undercooling," in *Materials Processing in Space* (N.B. Singh, V. Laxmanan, and E.W. Collings, eds.), Trans Tech Publications, 1989, p. 165.

Andrews, J. B., Briggs, C. J., and Robinson, M. B., "Containerless Low Gravity Processing of Immiscible Gold-Rhodium Alloys," in *Proceedings of VIII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 121-126.

Andrews, J.B., Sandlin, A.C., and Merrick, R.A., "Directional Solidification in Immiscible Systems: The Influence of Gravity," Adv. Space Res., 1990 (in press).

Andrews, J.B., Sandlin, A.C., Merrick, R.A., Dwyer, Z.B., Schmale, A.L., and Buckhalt, C.N., "Solidification in Immiscible Systems," in *Proceedings of IKI/AIAA Microgravity Science Symposium*, Moscow, May 1991 (submitted).

Banan, M., Gray, R.T., and Wilcox, W.R., "A Novel Approach to Determine the Heat Transfer Coefficient in Directional Solidification Furnaces," J. Cryst. Growth, 1990 (submitted).

Bertero, G.B., Hofmeister, W.H., Robinson, M.B., and Bayuzick, R.J.,"Splat Quenching of Undercooled Nb-Si Alloys from 20 to 27 at.% Si," in *Materials Processing in Space* (N.B. Singh, V. Laxmanan, and E.W. Collings, eds.), Trans Tech Publications, 1989, p. 173.

Bertero, G.A., Hofmeister, W.H., Evans, N.D., Wittig, J.E., and Bayuzick, R.J., "Devitrification Products of Rapidly Solidified Ni-Nb Amorphous Alloys," in *Proceedings of XII International Congress for Electron Microscopy* (L.D. Peachey and D.B. Williams, eds.), San Francisco Press, 1990, p. 950.

Bertero, G.B., Hofmeister, W.H., Bayuzick, R.J., and Robinson, M.B., "Rapid Solidification of Nb-Si Alloys in the Nb-Rich Eutectic Range," Met. Trans., 1990 (in press).

Bethin, J., Larson, D. J. and Dressler, B. S., "Orbital Processing of Aligned Magnetic Composites," in *Annual Report of Francis Bitter National Magnet Laboratory*, MIT Press, 1988.

Boettinger, W. J. and Perepezko, J. H., "Fundamentals of Rapid Solidification in Rapidly Solidified Crystallizing Alloys," (C. Adams, S. Das, and B. Kear, eds.), AIME, 1988.

Brattkus, K. and Davis, S.H., "The Linear Stability of Plane Stagnation-Point Flow Against General Disturbances," Quart. J. Mech. Appl. Math., 1990 (in press).

Brody, H.D., Zhao, Q., Piccone, T.J., an Flemings, M.C., "Solidification Models of Highly Undercooled Alloys," in *Modelling of Casting, Welding, and Advanced Solidification Processes* (M. Rappaz and M. Ozgu, eds.), TMS-AIME, 1991.

Caram, R., Chandrasekhar, S., and Wilcox, W.R., "Influence of Convection on Rod Spacing of Eutectics," J. Cryst. Growth 106, 294-302 (1990).

Caram, R. and Wilcox, W.R., "The Soret Effect in Eutectic Solidification," J. Cryst. Growth, 1990 (submitted).

Caram, R., Banan, M., and Wilcox, W.R., "Directional Solidification of Pb-Sn Eutectic with Axial Vibrations," J. Cryst. Growth, 1990 (submitted).

Cezairliyan, A. and Miiller, A.P., "A Dynamic Technique for Thermophysical Measurements at High Temperatures in a Microgravity Environment," Int. J. Thermophysics 11, 653-662 (1990).

Cezairliyan, A. and Miiller, A.P., "Radiance Temperature (in the Wavelength Range 522-906 nm) of Biobium and its Melting Point by a Pulse-Heating Technique," Int. J. Thermophysics, in press.

Cezairliyan, A., Miiller, A.P., Righini, F., and Rosso, A., "Wavelength Dependence of Normal Spectral Emmissivity of High-Temperature Metals at Their Melting Point," High Temp.-High Press., in press.

Cooper, R.F., Yoon, W.Y., and Perepezko, J.H., "Internal Nucleation of Magnesium Metasilicate Glasses by Solidification Processing," J. Am. Ceram. Soc., submitted.

Davis, S. H., "Hydrodynamic interactions in directional solidification," J. Fluid Mech. 212, 241 (1990)

Ecker, A., Alexander, J.I.D., and Frazier, D. O., "Classification of Fluid Flow in Front of Solidifying Monotectic Alloys," in *Proceedings of VIII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 115-120.

Ecker, A., Frazier, D.O., and Alexander, J.I.D., "Fluid Flow Solidifying Monotectic Alloys," Met. Trans. A 20, 2517-2527 (1989).

Facemire, B. R. and Frazier, D. O., "Separation Processes in Monotectic Systems," Res. Mechan. 24, 277-297 (1988).

Fecht, H.J., "Thermodynamic Properties and Crystallization Kinetics at High Liquid Undercooling," in *Proceedings of Workshop on Containerless Experimentation in Space* (E.H. Trinh, ed.), JPL No. 9-30, 1990, p. 222.

Fecht, H.J., "Aspects of Metastable Phase Formation in Undercooled Liquid Lead Alloys," Zeit. fur Metallkunde, 1991 (to appear)

Fecht, H.J., "Free Energy: Functions of Undercooled Glass Forming Liquids," Mat. Sci. Engr., 1990 (in press).

Fecht, H.J., Perepezko, J.H., Lee, M.C., and Johnson, W.L., "Thermodynamics Properties and Crystallization Kinetics of Undercooled Liquid Au-Pb-Sb Alloys," J. Appl. Phys. 68, 4494 (1990).

Frazier, D.O., Bhatia, S., and Loo, B.H., "The Infrared Spectrum of Solid Chlorotrifluoromethane," Spectroscopy Lett. 21, 819-829 (1988).

Frazier, D. O. and Facemire, B. R., "Non-Ideality Near the Monotectic Composition of a Miscibility-Gap Type System: Succinonitrile-Water," Thermochimica Acta 145, 301-329 (1989).

Frier, N., Shiohara, Y., and Russell, K.C., "Solidification Processing of Monotectic Alloy Metal Matrix Composites", in *Proceedings of 1988 Materials Research Society Symposium on Materials Processing*, 1989 (in press).

Ganesan, S. and Poirier, D. R., "Solute Redistribution in Dendritic Solidification with Diffusion in the Solid," J. Cryst. Growth, 1989 (in press).

Ganesan, S. and Poirier, D. R., "Conservation of Mass and Momentum for the Flow of Interdendritic Liquid during Solidification," Met. Trans. 21B, 173-181 (1990).

German, R.M., Farooq, S., and Kipphut, C.M., "Kinetics of Liquid Phase Sintering," Mat. Sci. Engr. A105, 215-224 (1988); reprinted in *Science of Hard Materials*, Volume 3 (V.K. Sarin, ed.), Elsevier, 1989, pp. 215-224.

German, R.M. and Farooq, S., "An Update on the Theory of Liquid Phase Sintering," in *Sintering '87*, Volume 1 (S. Somiya, M. Shimade, M. Yoshimura, and R. Watanable, eds.), Elsevier, 1989, pp. 459-464.

Glicksman, M.E., "Fundamentals of Dendritic Growth," in *Principles of Solidification and Materials Processing*, Volume 1, Chapter 2 (R. Trivedi and J.A. Sekar, eds.), Oxford & IBH Publishing, 1989, pp. 11-32.

Glicksman, M.E., "Fundamentals of Dendritic Growth," in *Crystal Growth in Science and Technology* (H. Arend and J. Hulliger, eds.), NATO SRI Series B: Physics 210, 167-183, Plenum Press, 1989.

Hallett, J., "On the Crystallization of Spheres and Shells," in *Proceedings of Third International Colloquium on Drops and Bubbles*, Monterey, CA, September 1988 (in press).

Heinrich, J. C. and Felicelli, S., "Thermosolutal Convection during Dendritic Solidification of a Binary Alloy," *Finite Elements in Flow Problems* (T.J. Chung, ed.), Hemisphere Publishing Co., 1989.

Heinrich, J.C., Felicelli, S., and Poirier, D.R., "Vertical Solidification of Dendritic Binary Alloys," Computer Meth. in Applied Mech. & Engr., 1990 (accepted).

Hofmeister, W. H., Bayuzick, R. J., and Robinson, M. B., "Experiments in Long Drop Tubes," in *Proceedings of Third International Colloquium on Drops and Bubbles,* (T.G. Wang, ed.), AIP, 1989.

Hopkins, J.A., McCay, M.H., Smith, L.M., and McCay, T.D., "Optical Methods for Study of Mass Transfer during Metal Model Directional Solidification," in *Proceedings of XXII International Conference on Heat and Mass Transfer*, Dubrovnik, Yugoslavia, August 1990.

Kegley, D.R., Wittig, J.E., Hofmeister, W.H., Bayuzick, R.J., and Rowe, R.G., "Effect of Bulk Undercooling on the Structure of Rapidly Solidified Titanium 4 wt.% Cerium," in *Materials Processing in Space* (N.B. Singh, V. Laxmanan, and E.W. Collings, eds.), Trans Tech Publications, 1989, p. 129.

Kipphut, C. M., Bose, A., Kishi, T., and German, R. M., "The Gravitational Effects on Liquid Phase Sintering," in Advances in Powder Metallurgy, Volume 2, 1989, pp. 415-429.

Kishi, T. and German, R.M., "Processing Effects on the Mechanical Properties of Tungsten Heavy Alloys," Int. J. Refractory Metals & Hard Mat. 9, 40-45 (1990).

Krishnan, S., Hansen, G. P., Hauge, R. H., and Margrave, J. L., "Spectral Emissivities and Optical Properties of Electromagnetically Levitated Liquid Metals as Functions of Temperature and Wavelength," High Temp. Sci. 29, 17 (1990).

Krishnan, S., Weber, J.K.R., Nordine, P.C., Schiffman, R.A., Hauge, R.H., and Margrave, J.L., "The Optical Properties of Liquid Aluminum, Silicon, Titanium, and Niobium," High Temp. Sci., 1991 (in press).

Krishnan, S., Weber, J.K.R., Nordine, P.C., Schiffman, R.A., and Reed, R.A., "The Refractive Index of Liquid Aluminum Oxide at 0.6328 um," J. Am. Ceram. Soc., 1991 (in press).

Krishnan, S., Weber, J.K.R., Nordine, P.C., and Schiffman, R.A.,"The Optical Properties and Melting Point of Pure Boron," High Temp. Sci., 1991 (submitted).

Krishnan, S., Weber, J.K.R., Nordine, P.C., Schiffman, R.A., Hauge, R.H., and Margrave, J.L., "The Optical Properties of Liquid Aluminum, Silicon, Titanium, and Niobium at 633 um," High Temp. Sci., 1991 (in press).

Larrousse, M.F. and Wilcox, W.R., "Interfacial Mass Transfer to a Cylinder Endwall during Spin-up/Spin-down," Chem. Eng. Sci. 45, 1571-1581 (1990).

Lowry, S.A. and McCay, T.D., "A Numerical Analysis of the Diffusion Dominated Solidification and Onset of Convection of a Metal Model (NH_4Cl-H_2O)," in *Proceedings of XXII International Conference on Heat and Mass Transfer*, Dubrovnik, Yugoslavia, August 1990.

MacDonald, R.A., "The Stability of a Current Carrying Hollow Liquid Metal Cylinder," J. Appl. Phys. 66, 5302-5308 (1989).

Mani, S.S. and German, R.M., "Kinetics of Gravity Induced Distortion in Liquid Phase Sintering," in *Advances in Powder Metallurgy*, Volume 1 (E.R. Andreotti and P.J. McGeehan, eds.), Metal Powder Industries Federation, 1990, pp. 453-468.

Marsh, S.P. and Glicksman, M.E., "Diffusion Controlled Coarsening at Finite Volume Fractions," in *Simulation and Theory of Evolving Microstructures* (M.P. Anderson and A.D. Rollett, eds.), TMMS, 1990, pp. 167-178.

Marsh, S.P. and Glicksman, M.E., "Dendritic Growth and Mushy Zone Behavior: Evolution and Prediction of Microstructural Lengthscales," in Proceedings of Japan-U.S. Cooperative Science Program, Oiso, Japan, 1989, pp. 9-18.

McCay, M.H. and McCay, T.D., "Processing of Metallic and Electronic Materials in Space," in *Principles of Solidification and Materials Processing*, Volume 2 (R. Trivedi, J. Sekhar, and J. Mazumdar, eds.), Oxford Publishing, 1989, pp. 547-563.

McCay, M.H., McCay, T.D. and Smith, L.M., "Solidification Studies Using a Confocal Optical Signal Processor," Appl. Opt. 29, 699-703 (1990).

McCay, T.D. and McCay, M.H., "Convective Instabilities during Directional Solidification of Light Solute Rejecting Materials," in *Proceedings of XXII International Conference on Heat and Mass Transfer*, Dubrovnik, Yugoslavia, August 1990.

McClure, J. L. and Cezairliyan, A., "Measurement of the Heat of Fusion of Titanium and a Titanium Alloy (90Ti-6A1-4V) by a Microsecond Resolution Transient Technique," Int. J. Thermophysics, in press.

McClure, J.L. and Cezairliyan, A., "Measurement of the Heat of Fusion of Molybdenum by a Microsecond-Resolution Transient Technique," Int. J. Thermophysics 11, 731-737 (1990).

Merchant, G. J. and Davis, S. H., "Flow-induced morphological instabilities due to temporally-modulated stagnation-point flow," J. Cryst. Growth 96, 737 (1989).

Merchant, G.J. and Davis, S.H., "Directional Solidification near Minimum c : Two-dimensional Isilas and Multiple Solutions," Phys. Rev. B 40, 11140 (1989).

Merchant, G.J. and Davis, S.H., "Morphological Instability in Rapid Directional Solidification," Acta Metall. Mater.38, 2683 (1990).

Miiller, A.P. and Cezairliyan, A., "A Dynamic Technique for Measuring Surface Tension at High Temperatures in a Microgravity Environment," Int. J. Thermophysics 11, 663-674 (1990).

Miyata, Y. and Glicksman, M.E., "Dendritic Growht with Crystalline Anisotropy," in Proceedings of Japan-U.S. Cooperative Science Program, Oiso, Japan, 1989, pp. 19-27.

Mohanty, A.P., "Determination of the Soret Coefficient of Mn-Bi Melts," M.S. Thesis, Clarkson University, 1990.

Moore, C.E. and Cardelino, B., "Static Second-order Polarizabilities of Amino-and Nitro-Benzophenones," J. Molec. Structure, in press.

Nandapurkar, P.J., Poirier, D.R., and Heinrich, J.C., "The Momentum Equation for Dendritic Solidification," Num. Heat. Transf., 1990 (accepted).

Neugebauer, G.T. and Wilcox, W.R., "Experimental Observation of the Influence of Furnace Temperature Profile on Convection and Segregation in the Vertical Bridgman Crystal Growth Technique," in *Proceedings of 41st IAF Congress*, 1990.

Nordine, P. C., Schiffman, R. A., Weber, J.K.R., and Krishnan, S., "The Vapor Pressure and Vaporization Enthalpy of Pure Boron," High Temp. Sci. (submitted).

Nordine, P. C. and Schiffman, R. A., "Imaging of Supersonic Levitation Jets by Laser-Induced Fluorescence from Atomic Mercury, AIAA Journal (submitted).

Ohsaka, K., Trinh, E. H. and Glicksman, M.E., "Undercooling of Acoustically Levitated Molten Drops," J. Cryst. Growth 106, 191 (1990).

Perepezko, J. H. and Allen, W. P., "Processing of Undercooled Melts", in *Proceedings of the Third International Colloquium on Drops and Bubbles*, Volume 197 (T. Wang, ed.), 1989, p. 289.

Poirier, D. R., "Segregation and Convection in Dendritic Alloys," *Progress in Low-Gravity Fluid Dynamics* (J. N. Koster and R. L. Sani, eds.), AIAA, 1990, pp. 385-409.

Riley, D. S. and Davis, S. H., "Eckhaus instabilities in generalized LandauGinzburg equations," Phys. Fluids A 1, 1745 (1989).

Riley, D. S. and Davis, S. H., "Hydrodynamic stability of a melt during the solidification of a binary alloy with small segregation coefficient," Physica D 39, 231 (1989).

Riley, D. S. and Davis, S. H., "Long-wave morphological instabilities in the directional solidification of a dilute binary mixture," SIAM J. Appl. Math. 50, 420 (1990).

Riley, D. S. and Davis, S. H., "Long-wave interactions in morphological and convective instabilities," IMA J. Appl. Math., 1990 (in press).

Robinson, M.B., Bayuzick, R.J., and Hoffmeister, W. H., "Undercooling Studies in Nb-Pt and Nb-Si Alloys Using the 105-Meter Drop Tube," Adv. in Space Res. 8, 321 (1988).

Rubinstein, E. R., Tirmizi, S. H., and Glicksman, M. E., "Long Term Purity Assessment in Succinonitrile," J. Cryst. Growth, 106, 89-96 (1990).

Sandlin, A. C., Andrews, J. B., and Curreri, P. A., "Directional Solidification of Immiscible Cu-Pb-Al Alloys Processed under Alternating High-g/Low-g Conditions," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 127-134.

Sandlin, A.C. and Schaefer, R.J., and Surface Energy Reduction in Fibrous Monotectic Structures," Met. Trans. A, 1990 (in press).

Selleck, M.E., Rajan, K., and Glicksman, M.E., "Organic Materials as an Experimental System for Grain Growth Studies," in *Simulation and Theory of Evolving Microstructures* (M.P. Anderson and A.D. Rollett, eds.), TMMS, 1990, pp. 79-84.

Seth, J., "The Effect of Convection on Lamellar Spacing of a Eutectic Growing with a Stepped Interface," M.S. Thesis, Clarkson University, 1990.

Shiohara, Y., Frier, N., Curreri, P. A., and Russell, K. C., "Microgravity Processing of Monotectic Alloy Composites," in *Advanced Materials and Manufacturing Processes*, 1988 (in preparation).

Suzuki, M., Piccone, T.J., Flemings, M.C., and Brody, H.D., "Solidification of Highly Undercooled Fe-P Alloys," Met. Trans., 1990 (submitted).

Suzuki, M., Piccone, T.J., and Flemings, M.C., Measurement of Rapid Solidification in Highly Undercooled Melts with a Video System," Met. Trans., 1990 (submitted).

Tewari, S.N. and Chopra, M.A., "Effect of Thermosolutal Convection on the Solid-Liquid Interface in Pb-Au Alloy," Micro. Sci. & Tech. 3(2), 99-106 (1990).

Trinh, E. H. "Levitation Studies of Physical Properties and of the Nucleation of Undercooled Liquids," in *Proceedings of the VIIth European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1989, pp. 503-508.

Trinh, E. H. and Perepezko, J. H. "Fluid Dynamics and Solidification of Drops and Shells," in *Progress in Low Gravity Fluid dynamics and Transport Phenomena* (J. Koster, ed.), AIAA, 1989.

Trinh, E. H., Marston, P. L., and Robey, J. L., "Acoustic Measurement of the Surface Tension of Levitated Drops," J. Colloid & Interface Sci. 124, 95 (1988).

Voorhees, P. W., "Coarsening in Binary Solid-Liquid Mixtures," Met. Trans. A (in press).

Weber, J.K.R., Schiffman, R. A., Krishnan, S., and Nordine, P. C., "Containerless Processing and Property Measurements of High Temperature Liquids and Solids," in *Proceedings VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 639-644.

Wittig, J.E., Kegley, D.R., Hofmeister, W.H., and Bayuzick, R.J., "Observation of Cerium-Oxides in Rapidly Solidified Ti-4 wt.% Ce," in *Proceedings of the 47th Annual Meeting of the Electron Microscopy Society of America* (G.W. Bailey, ed.), San Francisco Press, 1989, p. 506.

Yang, S.C., Mani, S.S., and German, R.M., "The Effect of Contiguity on Growth Kinetics in Liquid Phase Sintering," JOM 42, 16-19 (1990).

Yang, S.C., Mani, S.S., and German, R.M., "Grain Growth Behavior in Liquid Phase Sintered Heavy Alloys," in *Advances in Powder Metallurgy*, Volume 1 (E.R. Andreotti and P.J. McGeehan, eds.), Metal Powder Industries Federation, 1990, pp. 469-482.

Yeum, K. S., Laxmanan, V., and Poirier, D. R., "Efficient Estimation of Diffusion During Dendritic Solidification," Met. Trans. 20A, 2847-2856 (1989).

Zong, J-H. and Szekely, J., "An Improved Computational Technique for Calculating Electromagnetic Forces and Power Adsorptions Generated in Spherical and Deformed Body in Levitation Melting Devices," IEEE Trans. Magnetics, accepted.

Zong, J-H., Li, B., and Szekely, J., "The Electrodynamic and Hydrodynamic Phenomena in Magnetically-Levitated Molten Droplets. Part I. Steady State Behavior," Acta Astron., accepted.

Fluids, Interfaces, and Transport

Adriaans, M.J., et al., "High Resolution Thermometry near the Lambda Point," in *Proceedings of Low Temperature Physics Conference*, LT-19, August 1990, in press.

Alexander, J.I.D., "Low-Gravity Experiment Sensitivity to Residual Acceleration: A Review," Micro. Sci. & Tech. 3(2), 52-69 (1990).

Alexander, J.I.D. and Rosenberger, F., "Bridgman Crystal Growth in Low Gravity: A Scaling Analysis," in *Progress in Low-Gravity Fluid Dynamics and Transport Phenomena* (J. Koster and R. Sani, eds.), AIAA, 1190, pp. 87-117.

Alexander, J.I.D. and Zhang, Y., "The Sensivity of a Non-isothermal Liquid Bridge to Residual Acceleration," *IUTAM Symposium on Microgravity Fluid Mechanics*, Bremen, 1991, submitted.

Anikumar, A.V., Lee, C.P., and Wang, T.G., "Role of Drop Size and Viscosity on Mixing Following Coalescence," to be published.

Anikumar, A.V. and Wang, T.G., "Drop Coalescence Studies," in *Proceedings of NASA Workshop on Containerless Experimentation in Microgravity*, Pasadena, 1990.

Arpaci, V. S., Selamet, A., Chai, A. T., and Duh, J. C., "Multiscale Dimensional Foundations of Surface Tension and/or Buoyancy Driven Flows," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA, 1990, pp. 485-490.

Balasubramaniam, R. and Wilkinson, R. A., "Electrohydrodynamic Migration of Charged Droplet in an Insulating Fluid," in *Proceedings of First National Fluid Dynamic Congress*, Cincinnati, July 1988 (in press).

Balasubramaniam, R., and Lavery, J. E., "Numerical Simulation of Thermocapillary Bubble Migration Under Microgravity for Large Reynolds and Marangoni Numbers," Num. Heat Transf. A16, 175-187 (1989).

Balasubramaniam, R. and Rashidnia, N., "Interfacial Tension Measurement of Immiscible Liquids Using a Capillary Tube," AIChE Journal, 1990 (submitted).

Banish, R. M., Xiao, R-F., and Rosenberger, F., "Vapor Concentration Measurement with Photothermal Deflection Spectroscopy," J. Appl. Phys. 64, 2907-2916 (1988).

Barton, K.D. and Subramanian, R.S., "Thermocapillary Migration of a Liquid Drop Normal to a Plane Surface," J. Colloid & Interface Sci. 137, 170-182 (1990).

Behringer, R.P., Onuki, A., and Meyer, H., "Thermal Equilibration of Fluids near the Liquid-Vapor Critical Point: ^{3}He and ^{3}He-^{4}He Mixtures," J. Low Temp. Phys. 81, 71 (1990).

Bennett, M.J. and Brown, R.A., "Cellular Dynamics during Directional Solidification: Interactions of Multiple Cells," Phys. Rev. B39, 705-723 (1989).

Bennett, M.J. and Brown, R.A., "Nonlinear Dynamics in Periodically Repeated Sets of Directional Solidification Cells," Phys. Rev. B, submitted.

Berg, R.F. and Moldover, M.R., "Critical Exponent for the Viscosity of Carbon Dioxide and Xenon," J. Chem. Phys. 93, 1926 (1990).

Biringen, S. and Danabasoglu, G., "Computation of Convective Flow with Heat Transfer in Rectangular Cavities," J. Thermophys. Heat Transfer (accepted).

Biringen, S. and Danabasoglu, G., "Oscillatory Flow with Heat Transfer in a Square Cavity," Phys. Fluids (accepted).

Biringen, S. and Peltier, L. J., "Numerical Simulation of 3-D Benard Convection with Gravitational Modulation," Phys. Fluids (submitted).

Boukari, H., Shaumeyer, J.N., Briggs, M.E., and Gammon, R.W., "Critical Speeding Up in Pure Fluids," Phys. Rev. A 41, 2260 (1990).

Boukari, H., Briggs, M.E., Shaumeyer, J.N., and Gammon, R.W., "Critical Speeding Up Observed," Phys. Rev. Lett. 65, 2654 (1990).

Brown, R. A., "Theory of Transport Processes in Single Crystal Growth from the Melt," in *Chemical Engineering in Microelectronics Processing*, ACS Advances in Chemistry Series 222, 1989, pp. 35-104.

Brown, R.A., Perspectives on Integrated Modeling of Transport Processes in Semiconductor Crystal Growth," in *Advanced Heat Transfer in Manufacturing and Processing of New Materials*, Hemisphere Press, in press.

Brush, L.N., Coriell, S.R., and McFadden, G.B., "Directional Solidification of a Planar Interface in the Presence of a Time-Dependent Electric Current," J. Cryst. Growth 102, 725-742 (1990).

Callahan, M., "Some Numerical Solutions of Capillary Equations in Exotic Containers," Report LBID-1703, Lawrence Berkeley Laboratory, University of California, 1991.

Chae, H. B., Schmidt, J. W., and Moldover, M. R., "Surface Tension of Refrigerants R123 and R134a," J. Chem. Eng. Data, in press.

Chai, A. T., Duh, J. C., and Arpaci, V. S., "A Proposed Study on Liquid Droplet Evaporation under Microgravity," in *Proceedinqs of the VII European SYmposium on Materials and Fluid Sciences in Microgravity*, ESA, 1990, pp. 491-496.

Chiu, K-C. and Rosenberger, F., "Forced Versus Free Convection in Horizontal CVD Reactors," in *Chemical Vapor Deposition 1987* (G. Cullen, ed.), Electrochem. Soc., 1987, pp. 175-180.

Chui, T.C.P. and Swanson, D.R., "The Effects of Gravity in Second Sound," in *Proceedings of Low Temperature Physics Conference*, LT-19, August 1990, in press.

Concus, P. and Finn, R., "Dichotomous Behavior of Capillary Surfaces in Zero Gravity," Micro. Sci. & Tech. 3(2), 87-92 (1990).

Concus, P. and Finn, R., "Capillary Surfaces in Microgravity," in *Low-Gravity Fluid Mechanics and Transport Phenomena*, Volume 130 (J.N. Koster and R.L. Sani, eds.), AIAA, 1990, pp. 183-206.

Concus, P. and Finn, R., "Nonuniqueness and Uniqueness of Capillary Surfaces," in *Geometric Analysis and Computer Graphics*, Volume 17 (P. Concus, D. Hoffman, and R. Finn, eds.), MSRI Publications, 1991, p. 63.

Concus, P. and Finn, R., "Exotic Containers for Capillary Surfaces," J. Fluid Mech., 1991 (to appear).

Coriell, S.R. and McFadden, G.B., "Morphological Stability during Alloy Solidification," in *Morphology and Growth Unit of Crystals* (I. Sunagawa, ed.), Terra Scientific Publishing, 1989, pp. 335-347.

Coriell, S.R., McFadden, G.B., and Murray, B.T., "Modelling of Double-Diffusive Convection in Vertical Bridgman Growth," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 199-207.

Coriell, S.R., McFadden, G.B., and Sekerka, R.F., "Effect of Anisotropic Thermal Conductivity on the Morphological Stability of a Binary Alloy," J. Cryst. Growth 100, 459-466 (1990).

Coriell, S.R., McFadden, G.B., and Sekerka, R.F., "The Effects of Crystalline Anisotropy and Buoyancy-Driven Convection on Morphological Stability ," in *F. Weinberg International Symposium on Solidification Processing* (J.E. Lait and I.V. Samarasekera, eds.), Pergamon Press, 1990, pp. 44-51.

Coriell, S.R. and McFadden, G.B., "Instability during Directional Solidification: Gravitational Effects," in *Low Gravity Fluid Dynamics and Transport Phenomena* (J.N. Koster and R.L. Sani, eds.), AIAA, 1990, pp. 369-384.

Davis, R. H., "Near Contact Hydrodynamics of Two Viscous Drops," in *Proceedings Third International Colloquium on Drops and Bubbles*, Volume 197 (T.G. Wang, ed.), 1989.

Davis, S.H., "The Coupling of Morphological Instability and Fluid Flow," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 157-160.

Del Signore, D.M., Oliver, D.L.R., De Witt, K.J., and Rashidnia, N., "Experimental Demonstration of Diffusocapillary Flow in an Oil Droplet," J. Colloid & Interface Sci., 1990 (submitted).

Dijkstra, H. A. and P. H. Steen, "Thermocapillary Stabilization of the Capillary Breakup of an Annular Film of Liquid," J. Fluid Mech., 1990 (in press).

Dijkstra, H. A., "The Coupling of Marangoni and Capillary Instabilities in an Annular Thread of Liquid," J. Colloid & Interface Sci. 136, 151-159 (1990).

Dill, L.H., "On the Thermocapillary Migration of a Growing Drop," J. Colloid & Interface Sci., 1990 (submitted).

Doi, T. and Koster, J.N., "Marangoni Convection in Two Immiscible Liquid Layers Subject to a Horizontal Temperature Gradient," in *Proceedings of Physicochemical Hydrodynamic Conference*, PCH-7, MIT, June 1989.

Duh, J.C., "Numerical Modeling of Enclosure Convection," Acta Astron., 1990 (in press).

Duranceau, J. L. and Brown, R. A., "Convection in Earthbound and Microgravity Floating Zones," in *Proceedings of Third International Colloquium on Drops and Bubbles*, 197 (T.G. Wang, ed.), AIP, 1989, pp. 133-144.

Engelman, M. S. and Sani, R. L., "Finite Element Simulation of Temperature Dependent Free Surface Flows," in *Proceedings of Fourth International Symposium on Numerical Methods in Thermal Problems*, Swansea, UK, 1985 (accepted).

Fehribach, J. D. and Rosenberger, F., "Analysis of Models for Two Solution Crystal Growth Problems", J. Cryst. Growth 94, 6-14 (1989).

Hart, J.E., "Microgravity Laboratory Simulations of Planetary and Stellar Circulations," Micro. Sci. Tech. 3(3), 143-147 (1990).

Herczynski, A. and Kassoy, D. R., "Response of a Confined Gas to Volumetric Heating in the Absence of Gravity I: Slow Transients," Phys. Fluids (in press).

Hung, R.J., "Superfluid and Normal Fluid Helium II in a Rotating Tank under Low and Microgravity Environments," Proceed. Nat. Sci. Council A 14, 289-297 (1990).

Hung, R.J. and Leslie, F.W., "Bubble Shapes in a Liquid-Filled Rotating Container under Low Gravity," J. Spacecraft & Rockets 25, 70 (1988).

Hung, R.J., Tsao, Y.D., Hong, B.B., and Leslie, F.W., "Time Dependent Dynamical Behavior of Surface Tension on Rotating Fluids under Microgravity Environment," Adv. Space Res. 8, 205 (1988).

Hung, R.J., Tsao, Y.D., Hong, B.B., and Leslie, F.W., "Axisymmetric Bubble Profiles in a Slowly Rotating Helium Dewar under Low and Microgravity Environments," Acta Astron. 19, 411 (1989).

Hung, R.J., Tsao, Y.D., Hong, B.B., and Leslie, F.W., "Bubble Behaviors in a Slowly Rotating Helium Dewar in Gravity Probe-B Spacecraft Experiment," J. Spacecraft & Rockets 26, 167 (1989).

Hung, R.J., Tsao, Y.D., Hong, B.B., and Leslie, F.W., "Dynamics of Surface Tension in Microgravity Environment," *Progress in Aeron. & Astron.* 127, 124 (1990).

Hung, R.J., Tsao, Y.D., and Leslie, F.W., "Effect of G-Jitters on the Stability of Rotating Bubble under Microgravity Environment," Acta Astron. 21, 309 (1990).

Hung, R.J., Lee, C.C., and Tsao, Y.D., "Fluid Behavior in Microgravity Environment," Proceed. Nat. Sci. Council A 14, 21-34 (1990).

Hung, R.J., Lee, C.C., and Shyu, K.L., "Reorientation of Rotating Fluid in Microgravity Environment with and without Gravity Jitters," J. Spacecraft & Rockets 27, 1990 (in press).

Hung, R.J., Lee, C.C., and Leslie, F.W., "Response of Gravity Level Fluctuations on the Gravity Probe-B Spacecraft Propellant System," J. Propulsion & Power 6, 1990 (in press).

Hung, R.J., Lee, C.C., and Leslie, F.W., "Gravity Jitter Response Slosh Wave Excitation on the Fluid in a Rotating Dewar," Adv. Space Res. 11, 1990 (in press).

Hung, R.J., Lee, C.C., and Leslie, F.W., "Gravity-Jitter Effected Slosh Waves on the Stability of Rotating Bubble Under Microgravity Environment," Adv. Space Res. 11, 1990 (in press).

Hung, R.J. and Shyu, K.L., "Cryogenic Hydrogen Reorientation and Geyser Initiation at Various Liquid-Filled Levels in Microgravity," Adv. Space Res. 11, 1990 (in press).

Kim, D-H. and Brown, R. A., "Models of Convection and Segregation in the Growth of HgCdTe by the Vertical Bridgman Method," J. Cryst. Growth 96, 609-627 (1989).

Koschmieder, E. L. and Prahl, S. A., "Surface Tension Driven Benard Convection in Small Containers," J. Fluid Mech. (accepted).

Krylidis, A., Brown, R.A., and Walker, J.S., "Retardance of Particle Sedimentation in an Electrically Conductive Liquid by an Aligned Magnetic Field," Phys. Fluids 2, 2230-2240 (1990).

Law, B. M., Segre, P. N., Gammon, R. W., and Sengers, J. V., "Light-scattering Measurements of Entropy and Viscous Fluctuations in a Liquid Far from Thermal Equilibrium," Phys. Rev. A 41, 816 (1990).

Lee, C. P., and Wang, T. G., "The Effects of Sound on the Nucleation Rate of an Undercooled Liquid," (submitted for publication).

Lee, C. P., and Wang, T. G., "Dynamics of Thin Liquid Sheets," in *Proceedings of the Third International Colloquium on Drops and Bubbles*, Volume 197 (T.G. Wang, ed.), AIP, 1989, pp. 496-504.

Lee, C. P. and Wang, T. G., "The Centering Dynamics of a Thin Liquid Shell in Capillary Oscillations," J. Fluid Mech. 188. 411-435 (1988).

Lee, C. P. and Wang, T. G., "Acoustic Radiation Force on a Heated Sphere Inclding Effects of Heat Transfer and Acoustic Streaming," J. Acoust. Soc. Am. 83(4), 1324-1331 (1988).

Lee, C. P. and Wang, T. G., "Acoustic Radiation Potential on a Small Sphere due to Two Orthgonal Standing Waves," J. Acoust. Soc. Am. 83(6), 2459-2461 (1988).

Lee, C. P., and Wang, T. G., "Outer Acoustic Streaming," J. Acoust. Soc. Am. 88, 2367-2375 (1990).

Lee, C.P. and Wang, T.G., "The Effects of Pressure on the Nucleation Rate of an Undercooled Liquid," J. Cryst. Growth, 1990 (in press).

Lee, J.T.C. and Brown, R.A., "The Planar to Cellular Transition and the Long Time Scale Dynamics of Pattern Formation during Thin-Film Directional Solidification," Mat. Res. Soc., in press.

Leung, E., Baroth, E., Chan, C. K., and Wang, T. G., "Thermal Acoustical Interaction and Flow Phenomenon," *Proceedings of the Third International Colloquium on Drops and Bubbles*, Volume 197 (T.G. Wang, ed.), AIP, 1989, pp. 58-70.

Li, Q., Chui, T.C.P., and Lipa, J.A., "Measurements of the Kapitza Boundary Resistance between Copper and Helium above the Lambda Transition," Physica B 165, 533 (1990).

Ma, W-J., Banavar, J.R., and Koplik, J., "Dynamics of Freezing in Confined Geometries," Phys. Rev. Lett., 1990 (submitted).

Marsh, S.P. and Glicksman, M.E., "Geometric Statistical Mechanics for Non-Spherical Bubbles and Droplets," in *Drops and Bubbles*, Volume 197 (T.G. Wang, ed.), AIP, 1989, pp. 216-221.

Maslanik, M. K., Sani, R. L., Gresho, P. M., "An Isoparametric Finite Element Stokes Flow Test Problem." Comm. Appl. Num. Meth., 1989 (in press).

McFadden, G.B., Coriell, S.R., Murray, B.T., Glicksman, M.E., and Selleck, M.E., "Effect of a Crystal-Melt Interface on Taylor-Vortex Flow," Phys. Fluids A2, 700-705 (1990).

McLinden, M. O., Ballagher, J. S., Weber, L. A., Morrison, G., Ward, D., Goodwin, A.R.H., Moldover, M. R., Schmidt, J. W., Ohae, H. B., Bruno, T., Ely, J. F., Huber, M. L., "Measurement and R134a and R123," ASHRAE Trans., in press.

McManus, S.P., Wessling, F.C., Matthews, J.H., Patel, D., and Weiker, D.J., "Processing of a Rigid Foam at Variable Gravity Levels," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 519-524.

Merte, H. and Judd. R. L., "Variation of Superheat with Subcooling in Nucleate Pool Boiling," J. Heat Transf., submitted.

Meyer, H., "Experimental Techniques for Transport Measurements in Fluid Helium at Low Temperatures," *Transport Properties in Fluids* (A. Nagashima, J.V. Sengers and W.A. Wakeham, eds.), in press.

Meyer, H., Howald, C., Qin, X., and Nham, H.S., "Shear Viscosity of ^{3}He-^{4}He Mixturs near the Tricritical Point," in *Proceedings of Low Temperature Physics Workshop, Eighth University of Oregon Conference on Low Temperature Physics*, January 1991, Washington, DC (in press).

Miles, D. G. and Schmidt, J. W., "Structure of the Polymer Solvent Interface," J. Chem. Phys., in press.

Morton, D.S., Subramanian, R.S., and Balasubramaniam, R., "The Migration of a Compound Drop Due to Thermocapillarity," Phys. of Fluids A2, 2119-2133 (1990).

Myerson, A.S. and Lo, P-Y., "Aging, Cluster Formation and Diffusion in Supersaturated Solutions," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 7-12.

Neitzel, G. P. and Jankowski, D. F., "Application of Energy-Stability Theory to Problems in Crystal Growth," *Progress in Low-Gravity Fluid Dynamics and Transport Phenomena* (J.N. Koster and R.L. Sani, eds), 1990.

Nyce, T. and Rosenberger, F., "Buoyancy Effects and Deposition Distribution in Barrel Reactors," in *Chemical Vapor Deposition 1987* (G. Cullen, ed.), Electrochem. Soc., 1987, pp. 53-60.

Nyce, T. and Rosenberger, F., "A General Method for Calculating Velocities and Heat Transfer in Closed Loop Natural Convection Systems," Int. J. Heat Mass Transf., submitted.

Onuki, A., "On New Nonequilibrium Effects in Stirred Fluids," Progress of Theoretical Physics, Supplement 99 (1989).

Onuki, A., Hao, H., and Ferrell, R.A., "Fast Adiabatic Equilibration in a Single Component Fluid near the Liquid-Vapor Critical Point," Phys. Rev. A 41, 2256 (1990).

Onuki, A. and Ferrell, A., "Adiabatic Heating Effect near the Gas-Liquid Critical Point," Physica A 164, 245-264 (1990).

Ostrach, S., and Rivas, D., "Low Prandtl Thermocapillary Flow in Shallow Enclosures," PCH Journal 11, 765-783 (1989).

Ouazzani, J., Chiu, K-C., and Rosenberger, F., "Effects of Thermal Diffusion on Layer Thickness Uniformity," in *Chemical Vapor Deposition 1987* (G. Cullen, ed.), Electrochem. Soc., 1987, pp. 165-174.

Ouazzani, J. and Rosenberger, F., "Three-Dimensional Modelling of Horizontal Chemical Vapor Deposition I: MOCVD at Atmospheric Pressure, J. Cryst. Growth 100, 545-576 (1990).

Ouazzani, J. and Rosenberger, F., "Three-dimensional Numerical Modelling of Transport in Horizontal MOCVD Reactors," in *Chemical Vapor Deposition 1990* (G. Cullen and K. Spear, eds.), Electrochem. Soc., 1990, pp. 82-91.

Peltier, L.J., Biringen, S., and Koster, J.N., "Numerical Simulation of Thermocapillary Flow in a Layered Two-Fluid System as Model for Encapsulated Crystal Growth," Bull. Am. Phys. Soc. 35, 2312 (1990).

Peltier, L.J., Biringen, S. and Chait, A., "Application of Implicit Numerical Techniques to the Solution of the Three-Dimensional Diffusion Equation," Int'l. J. Num. Heat Transf. (submitted).

Prakash, A., Peltier, J., Fijita, D., Koster, J.N., and Biringen, S., "Convective Instabilities in a Two-Layer Fluid System,", AIAA Paper 91-0313, 1991.

Pratte, J. M. and Hart, J. E., "Endwall Driven, Low Prandtl Number Convection in a Shallow Rectangular Cavity," J. Cryst. Growth (in press).

Pulicani, J.P. and Ouazzani, J., "A Fourier-Chebyshev Pseudospectral Method for Solving Steady 3-D Navier-Stockes and Heat Equations in Cylindrical Cavities," Computers & Fluids, in press.

Pulicani, J., Krukowski, S., Alexander, J.I.D., Ouazzani, J., and Rosenberger, F., "Convection in an Asymmetrically Heated Cylinder," Phys. Fluids, submitted.

Rashidnia, N. and Balasubramaniam, R., "Thermocapillary Migration of Liquid Droplets in a Temperature Gradient in a Density-Matched System," Experiments in Fluids, 1990 (in press).

Rogers, J. R. and Davis, R. H., "Modeling of Collision and Coalescence of Droplets During Microgravity Processing of Zn-Bi Immiscible Alloys." Met. Trans. 21A, 59-68 (1990).

Rogers, J.R. and Davis, R.H., "The Effects of van der Waals Attractions on Cloud Droplet Growth and Coalescence," J. Atmos. Sci. 47 1075 (1990).

Rosenberger, F., "Flow Dynamics and Modelling in CVD," in *Chemical Vapor Deposition 1987* (G. Cullen, ed.), Electrochem. Soc., 1987, pp. 11-22.

Rosenberger, F., Alexander, J.I.D., Nadarajah, A., and Quazzani, J., "Influence of Residual Gravity on Crystal Growth Processes," Micro. Sci. & Tech. 3(3), 162-164.

Rosenberger, F., Xiao, R-F., and Alexander, J.I.D., "Morphological Stability of Interfaces with Strong Anisotropy in Growth Kinetics," in *Lectures on Crystal Growth* (H. Komatsu, ed.), in press.

Ross, H.D., Schiller, D.N., Sirignano, W.A., and Disimile, P., "Dynamics of Cylindrically Enclosed Fluids Heated Centrally from Above," J. Thermophys. & Heat Transf., 1990 (submitted).

Ruggles, J. S., Cook, R. G., and Cole, R., "Microgravity Bubble Migration in Rotating Flows," J. Spacecraft and Rockets 27, 43 (1990).

Ruggles, J.S., Brone, D., Cook, R.G., and Cole, R., "Bubble Trajectories in Rotating Liquids," in *Proceedings of the VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 429-434.

Rushing, C., Overfelt, T., and Williamson, J., "Fluid Damping in Directional Solidification Experiments on NASA's KC-135 Aircraft," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 109-114.

Russo, M. J., and P. H. Steen, "Shear-stabilization of the Capillary Breakup of a Cylindrical Interface", Phys. Fluids A 1, 1926-1937 (1989).

Sackinger, P. A. and Brown, R. A., "Effect of Sidewall Boundary Conditions on the Existence of Codimension Two Bifurcation Points in Two-dimensional Rayleigh-Benard Convection," Phys. Fluids, 1988 (in press).

Saville, D.A., "The Roles of Transport Phenomena in Protein Crystal Growth," J. Cryst. Growth, 1990 (in press).

Saville, D. A. and Baygents, J. C., "The Migration of Charged Drops and Bubbles in Electrolyte Gradients," Physicochem. Hydrodynam. 10, 543-560 (1988).

Saville, D.A. and Baygents, J.C., "The Circulation Produced in a Drop by an Electric Field: A High Field Strength Electrokinetic Model," in *Proceedings of Third International Colloquium on Drops and Bubbles* (T. Wang, ed.), AIP, 1989, pp. 7-17.

Saville, D.A. and Baygents, J.C., "Electrophoresis of Drops and Bubbles," J. Chem. Soc. Faraday Trans., 1990 (in press).

Saville, D.A. and Baygents, J.C., "Electrohoresis of Drops and Bubbles in Weak Electrolytes," J. Colloid & Interface Sci., 1990 (in press).

Schiller, D.N., Abramzon, B., and Sirignano, W.A., "Enclosed Liquid/Gas System Heated Nonuniformly from Above. Variable Properties and Vaporization Effects," in *Heat Transfer Phenomena in Radiation, Combustion and Fires*, Volume 106, HTD, 1989, pp. 389-398.

Schiller, D.N. and Sirignano, W.A., "Buoyant-Thermocapillary Flow in Nonuniform Supra-Heating: I. Liquid-Phase Behavior, II. Two-Phase Behavior," J. Thermophys. & Heat Transf., 1991 (accepted).

Schmidt, J. W., "Adsorption at the Vapor-Liquid Interface Near the Consolute Point," Phys. Rev. A, in press.

Schneider, G.E., "Finite Difference Computation of Liquid/Solid Phase Change Including Free Convection in the Melt: Comparison with Experimental Data," AIAA J. Thermophys. & Heat Transfer 4, 366-374 (1990).

Shaumeyer, J.N., Gammon, R.W., and Sengers, J.V., "Measurement of Diffusivities with Photon-Correlation Spectroscopy," in *IUPAC Volume on Measurement of Transport Properties*, in press.
Shen, Y., "Energy Stability of Thermocapillary Convection in a Model of Float-Zone Crystal Growth," Ph.D. Dissertation, Arizona State University, May 1989.

Shen, Y., Neitzel, G. P., Jankowski, D. F., and Mittelmann, H. D., "Energy Stability of Thermocapillary Convection in a Model of the Float-Zone, Crystal Growth Process," J. Fluid Mech., submitted.

Snow, W.M., Ma, W-J., Wang, Y., Sokol, P.E., Koplik, J., and Banavar, J.R., "Freezing in Restricted Geometries," Nature, 1990 (submitted).

Subramanian, R.S., "The Motion of Bubbles and Drops in Reduced Gravity," in *Transport Processes in Bubbles, Drops, and Particles* (R.P. Chhabra and D. DeKee, eds.), Hemisphere, 1990 (in press).

Sutrisno, and Kassoy, D. R., "Thermoacoustic and Natural Convection in Confined Gaseous Helium Subjected to Boundary Heating," J. Fluid Mech. (in press).

Tan, C.-H., Duh, J. C., "Pressure Gradient Method for Solving Incompressible Navier-Stokes Equations with Curvilinear Coordinate System," in *Proceedings of the 7th International Conference on Mathematical and Computer Modelling*, Chicago, August 1989 (in press).

Trinh, E.H., "Levitation Studies of the Physical Properties and Nucleation of Undercooled Liquid," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 503-508.

Tsau, F.H., Elghobashi, S.E., and Sirignano, W.A., "Effects of G-jitter on a Thermal Buoyant Flow," Paper No. 90-0653, *28th AIAA Aerospace Sciences Meeting*, Reno, January 1990.

Tsau, F.H., Elghobashi, S.E., and Sirignano, W.A., "Effects of G-jitter on a Thermally Buoyant Flow," J. Thermophys. & Heat Transf., submitted.

Tsiveriotis, K. and Brown, R.A., "Bifurcation Structure and the Eckhaus Instability," Phys. Rev. Lett. 63, 2048-2051 (1989).

Van Alstine, J.M., Bamberger, S., Harris, J.M., Snyder, R.S., Boyce, J.F., and Brooks, D.E., "Phase Partitioning Experiments on Shuttle Flight STS-26," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 399-408.

Weislogel, M.M. and Ross, H.D., "Surface Reorientation and Settling in Cylinders upon Step Reduction in Gravity," Micro. Sci. Tech. 3(1), 24-32 (1990).

Weislogel, M.M. and Ross, H.D., "Surface Settling in Partially Filled Containers upon Step Reduction in Gravity," NASA TM-103641, November 1990.

Wang, S., Howald, C., and Meyer, H., "Shear Viscosity of Liquid ^{3}He-^{4}He Mixtures near the Superfluid Transition," J. Low Temp. Phys. 79, 151 (1990).

Wang, T.G., Allen, J.L., and Anikumar, A.V., "Acoustic Levitation and Manipulation," J. Acoust. Soc. Am. 87 (Suppl. 1), S32 (1990).

Wang, T. G., Trinh, E., Croonquist, A., and Elleman, D. D., "Dynamics of Rotating and Oscillating Drops," *Proceedings of the Third International Colloquium on Drops and Bubbles*, Volume 197 (T.G. Wang, ed.), AIP, 1989, pp. 106-111.

Wheeler, A.A., McFadden, G.B., Coriell, S.R., and Hurle, D.T.J., "The Effect of an Electric Field on the Morohological Stability of the Crystal-Melt Interface of a Binary Alloy III. Weakly Nonlinear Theory," J. Cryst. Growth 100, 78-88 (1990).

Worden, P. W., "Almost Exactly Zero: The Equivalence Principle," in *Near Zero: New Frontiers of Physics*, (J.D. Fairbank, B.S. Deaver, C.W.F. Everitt, and P.F. Michelson, eds.), W.H. Freeman & Co., 1988, pp. 766-783.

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Morphological Evolution of Growing Crystals - A Monte Carlo Simulation," Phys. Rev. A 38, 2447-2456 (1988).

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Morphological Evolution of Crystals Growing in the Presence of a Uniform Drift: A Monte Carlo Simulation," Phys. Rev. A 39, 6397-6401 (1989).

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Growth Morphology with Anisotropic Surface Kinetics," J. Cryst. Growth 100, 313-329 (1990).

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Simulation of Surface Morphologies in Crystal Growth from Vapor," J. Cryst. Growth, in press.

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Growth Morphology of Crystal-Vapor Interfaces," Phys. Rev., in press.

Xiao, R-F., Alexander, J.I.D., and Rosenberger, F., "Growth Morphologies of Crystal Surfaces," Phys. Rev., in press.

Yiantsios, S. G. and Davis, R. H., "On the Buoyancy Driven Motion of a Drop Towards a Rigid Surface or a Deformable Interface," J. Fluid Mech. 217, 547 (1990).

Yiantsios, S.G. and Davis, R.H., "Close Approach and Deformation of Two Viscous Drops due to Gravity and van der Waals Forces," J. Colloid & Interface Sci., 1990 (submitted).

Yung, C. N., De Witt, K. J., Brockwell, J. L., McQuillen, J.B., and Chai, C-T., "A Numerical Study of Parameters Affecting Gas Bubble Dissolution," J. Colloid & Interface Sci. 127, 442 (1989).

Zhang, X. and Davis, R.H., "The Rate of Collisions of Small Drops Due to Browian or Gravitational Motion," J. Fluid Mech., 1990 (submitted).

Zhang, Y. and Alexander, J.I.D., "Surface Tension and Buoyancy Driven Flow in a Nonisothermal Liquid Bridge," Int. J. Num. Meth. Fluids, submitted.

Zhang, Y. and Alexander, J.I.D., "Sensitivity of Liquid Bridges Subject to Axial Residual Acceleration," Phys. Fluids A 2, 1966-1974 (1990).

Biotechnology

Acrivos, A., Jeffrey, D. J., and D. A. Saville, "Particle Migration in Concentration Suspensions: Thermophoresis and Electrophoresis," J. Fluid Mech., in press.

Bamberger, S., Brooks, D.E., Van Alstine, J.M., Harris, J.M., and Snyder, R.S., "Demixing Kinetics of Phase Separated Polymer Solutions in Microgravity," in *Separations Using Aqueous Phase Systems i-Applications in Cell Biology and Biotechnology* (D. Fisher and I.A. Sutherland, eds.), Plenum Press, 1989, pp. 281-286.

Bamberger, S., Van Alstine, J.M., Brooks, D.E., Boyce, J., and Harris, J.M., "Phase Partitioning in Reduced Gravity," in *Low Gravity Fluid Dynamics and Transport Phenomena* (J.N. Koster and R.L. Sani, eds.), AIAA, 1990, pp. 603-630.

Boyce, J.F., Harris, J.M., Van Alstine, J.M., and Brooks, D.E., "Dextran Coated Glass Slides as a Model for Cell Surface Interactions with Aqueous Two Phase Polymer Systems," in *Separations Using Aqueous Phase Systems i- Applications in Cell Biology and Biotechnology* (D. Fisher and I.A. Sutherland, eds.), Plenum Press, 1989, pp. 287-298.

Boyce, J. F., Boyce, B. A. Hovanes, J. M. Harris, J. M. Van Alstine, and D. E. Brooks, "The Wetting Behavior of Aqueous Two-Phase Polymer Test Systems on Dextran Coated Glass Surfaces: Effect of Molecular Weight," J. Colloid and Interface Sci., 1990 (submitted).

Brooks, D.E., Van Alstine, J.M., Stocks, S.J., and Sharp, K.A., "PEG Deriviatized Ligands with Hydrophobic and Immunological Specificity," *Biomedical Applications of Polyethylene Glycol Chemistry* (J.M. Harris, ed.), Plenum Press, 1990 (in press).

Bugg, C.E. and DeLucas, L.J., "Protein Crystal Growth in Space," Space Commerce (J.J. Egan, ed.), Gordon & Breach, 1990, pp. 155-159.

Carter, D.C. and He, X.M., "Structure of Human Serum Albumin," Science 249, 302-303 (1990).

Carter, D.C., He, X.M., Twigg, P.D., and Casale, E., "Drug Binding to Human Serum Albumin: Functional and Therapeutic Implications," Technology 2000 Proceedings, Washington, DC, November 1990 (in press).

Carter, D.C., He, X.M., Munson, S.H., Twigg, P.D., Gernert, K.M., Broom, M.B., Miller, T.Y., "Three-dimensional Structure of Human Serum Albumin," Science 244, 1195-1198 (1989).

Casale, E., Wenisch, E., He, X.M., Rhigetti, P.F., Snyder, R.S., Jungbauer, A., Tauer, C., Ruker, F., and Carter, D.C., "Crystallization of the Fab from a Human Monoclonal Antibody Against gp41 of Human Immunodeficiency Virus Type I.," J. Mol. Biol. 216, 511-512 (1990).

Danon, A., Goldstein, A. H., McDaniel, R. S., Humphreys, R. C., and Sammons, D., "Identification of In Vitro Translation Products Associated with Halophytic or Salt Stressed Growth of *Lycopersicon pennellii*," in Plant Physiology, 1991 (submitted).

DeLucas, L. J., Smith, C. D., Smith, H. W., Senadhi, V-K, Senadhi, S. E., Ealick, S. E., Carter, D. C., Snyder, R. S., Weber, P. D., Salemme, F. R., Ohlendorf, D. H., Einspahr, H. M., Navia, M. A., McKeever, B. M., Nagabhushan, T. L., Nelson, G., McPherson, A., Koszelak, S., Taylor, G. Stammers, D., Powell, K., Darby, G., and Bugg, C. E. "Protein Crystal Growth Results for Shuttle Flights STS-26 and STS-29," J. Cryst. Growth, 1990 (in press).

DeLucas, L.J., Smith, C.D., Smith, H.W., Vijay-Kumar, S., Senadhi, V-K, Senadhi, S.E., Ealick, S.E., Bugg, C.E., Carter, D.C., Snyder, R.S., Weber, P.D., Salemme, F.R., Ohlendorf, D.H., Einspahr, H.M., Clancy, L.L., Navia, M.A., McKeever, B.M., Nagabhushan, T.L., Nelson, G., McPherson, A., Koszelak, S., Taylor, G. Stammers, D., Powell, K., and Darby, G., "Protein Crystal Growth in Microgravity," in *Proceedings of VII European Symposium on Materials Sciences under Microgravity*, ESA SP-295, 1990, pp. 31-34.

DeLucas, L.J. and Bugg, C.E., "Protein Crystal Growth Procedure for the U.S. Space Shuttle," in *Methods: A Comparison to Methods in Enzymology*, Volume 1, 1990, pp. 105-109.

DeLucas, L.J., Smith, C.D., Carter, D.C., Snyder, R.S., McPherson, A., Koszelak, S., and Bugg, C.E., "Microgravity Protein Crystal Growth: Results and Hardware Development," J. Cryst. Growth, 1990 (in press).

DeLucas, L.J., Smith, C.D., Carter, D.C., Twigg, P., He, X-M., Snyder, R.S., Weber, P.C., Salemme, F.R., Ohlendorf, D.H., Einspah, H.M., Clancy, L.L., McPherson, A., Koszelak, S., Vandonselaar, M.M., Prasad, L., Quail, J.W., Delbaere, L.T.J., and Bugg, C.E., "Protein Crystal Growth Aboard the U.S. Space Shuttle Flights STS-31 and STS-32," Adv. Space Res., 1990 (in press); *Proceedings of COSPAR Meeting*, 1990, The Hague.

DeLucas, L.J. and Bugg, C.E., "Protein Crystal Growth in Space," in *Advances in Space Biology and Medicine*, 1990 (in press).

DeMattei, R. C. and R. S. Feigelson, "Growth Rate of Canavalin Crystals," J. Cryst. Growth 97, (1990).

DeMattei, R.C. and Feigelson, R.S., "Solubility of Canavalin," J. Cryst. Growth, 1990 (in press).

DeMattei, R. C. and R. S. Feigelson, "Preliminary Comparisons of Buoyancy Driven Flows Around Growing Crystals in Inorganic and Biological Systems-Rochelle Salt, Lysozyme and Canavalin," to be published.

Diamond, S.L., Eskin, S.G., and McIntire, L.V., "Fluid Flow Stimulates Tissue Plasminogen Activator Secretion by Cultured Human Endothelial Cells," Science 243, 1483 (1989).

Diamond, S.L., Sharefkin, J.B., Dieffenbach, C., Frasier-Scott, K., McIntire, L.V., and Eskin, S.G., "Tissue Plasminigen Activator Messenger RNA Levels Increase in Cultured Human Endothelial Cells Exposed to Laminar Shear Stress," J. Cell. Phys. 143, 364 (1990).

Fehribach, J. D. and Rosenberger, F., "Analysis of Models for Two Solution Crystal Growth Problems", J. Cryst. Growth, 94, 6-14 (1989).

Frangos, J.A., McIntire, L. V., and Eskin, S.G., "Shear Stress Induced Stimulation of Mammalian Cell Metabolism," Biorech. & Bioengr. 32, 1053-1060 (1988).

Geier, B. M., Kleinhans, P., Zimmerman, U., Hannig, K., and Sammons, D. W., "The Influence of Electrofusion Conditions on the Free-Flow Electrophoretic Mobility and Size Distribution of Myeloma Cells," Electrophoresis, (in press).

Givargizov, E.I., Kliya, M.O., Melin-Adamyan, V.R., Grebenko, A.I., De Mattei, R.C., and Feigelson, R.S., "Artifical Epitaxy (Graphoepitaxy) of Proteins," J. Cryst. Growth, 1990 (submitted).

He, X.M. and Carter, D.C., "Full-Matrix Inversion Procedure for Minimum Variance Fourier Coefficient (MVFC) Refinement," Acta Cryst. A45, 308 (1989).

Heydt, A. and Mosher, R. A., "The Impact of Boundary Conditions in Free Flow Field Step Electrophoresis," Electrophoresis, in press.

Karr, L.J., Harris, J.M., Van Alstine, J.M., and Snyder, R.S., "PEG-Modified Protein A for Use in Immunoaffinity Phase Partitioning," in *Separations Using Aqueous Phase Systems i- Applications in Cell Biology and Biotechnology* (D. Fisher and I.A. Sutherland, eds.), Plenum Press, 1989, pp. 93-202.

Kim, I. and Cho, Y., "The Hydrodynamics of Bent Cylinder in Viscoelastic Fluid," J. Non Newt. Fluid Mech. 33, 219-224 (1989).

Kim, I., Cho, Y.I., and Chee, D-W., "A Mechanical Model of the Separation of Large DNA Molecules in a Diluted Viscoelastic Solution," in *Bioprocess Engineering Symposium*, AIME, 1989, pp. 159-162.

Kim, J. and Cho, Y., "The Hydrodynamics of a Thin Cylinder Falling in a Viscoelastic Fluid," J. Fluid Dynam. (submitted).

Kowalski, M., Hannig, K., Klock, G., Gessner, P., Zimmermann, U., Neil, G.A., and Sammons, D.W., "Electrofused Mammalian Cells Analyzed by Free-Flow Electrophoresis," Biotechniques 9, 332 (1990).

Linton, P.J., Decker, D., and Klinman, N.R., "Primary Antibody-forming Cells and Secondary B-cells are Generated from Separate Precursor Cell Subpopulations," Cell 59, 1049 (1989).

Lyne, J.E., Carter, D.C., He, X.M., Stubbs, G., and Hash, J.H., "Preliminary Crystallographic Examination of a Novel Fungal Lysozyme from *Chalaropsis*," J. Biol. Chem. 265, 6928-6930 (1989).

McPherson, A., "Current Approaches to Macromolecular Crystallization," Eur. J. Biochem. 189, 1-23 (1990).

McPherson, A., Greenwood, A., and Day, J., "The Effect of Microgravity on Protein Crystal Growth," *Proceedings of COSPAR Symposium*, The Hague, June 1990; Adv. Space Res., 1990 (in press).

Mosher, R. A., Kuhn, R., Wagner, H., and Thormann, W., "Experimental and Theoretical Dynamics of Isoelectric Focusing III: Transient Multi-peak Approach to Equilibrium of Proteins in Simple Buffers," Electrophoresis, in press.

Neil, G.A., Sauners, T., and Sammons, D.W., "Activation of Primary and Secondary Murine B Cell Precursors with Anti-CD3 MAb Conjugated Bead in vitro," ASGSB Bull. 4, 42 (1990).

Neil, G.A., Blum, A., and Weinstock, J.V., "Substance P but Not Vasoactive Intestinal Peptide Modulates Immunoglobulin Secretion in Murine Schistosomiasis," Immunol., 1991 (in press).

Neil, G.A. and Zimmermann, U., "Electrofusion," Methods Enzymol., 1991 (in press).

Nyce. T. A. and Rosenberger, F., "Growth of Protein Crystals Suspended in a Closed Loop Thermosyphon", J. Cryst. Growth, in press.

Plank, L. D., Kunze, M. E., Gaines, R. A., and Todd, P., "Density Gradient Electrophoresis of Cell in a Reversible Gel," Electrophoresis 9, 647-649 (1988).

Pusey, M. L., Witherow, W. K., and Naumann, R. J., "Preliminary Investigations into Solutal Flow About Growing Tetragonal Lysozyme,: J. Cryst. Growth, 1988 (in press).

Sammons, D. W., R. C. Humphreys, N. H. Lin, K. H. Kwan, W. J. Ko, N. Egen, F. S. Markland and K. Chen, "Computerized Strategy for Estimation of Protein Purity," *Frontiers of Bioprocessing*, Chapter 24 (S.S. Sikdar, M. Bier and P. Todd, eds.), CRC Press, 1990, pp. 285-292.

Sammons, D.W., Zimmermann, U., Klinman, N.R., Gessner, P., Humphreys, R.C., Emmons, S.P., and Neil, G.A., "An Experimental System for Determining the Influence of Microgravity on Lymphocyte Activation and Cell Fusion," Adv. Space Res., in press.

Schnettler, R., Gessner, P., Zimmerman, U., Neil, G. A., Urnovitz, H. B., and Sammons, D. W., "Increased Efficiency of Mammalian Somatic Cell Hybrid Production Under Microgravity Conditions During Ballistic Rocket Flight," Appl. Micro. Tech. 2, 2-9 (1989).

Sharnez, R. and Sammons, D., "Resolving Real and Apparent Heterogeneity in Continuous Flow Electrophoresis," BioPharm. 2(1), 54-57 (1989).

Van Alstine, J. M., Brooks, D. E., Sharp, K. A., Snyder, R. S., Karr, L. J., and Harris, J. M., "Application of Partition Technology to Particle Electrophoresis," in *Advances in Separations Using Aqueous Phase Systems in Biology and Biotechnology* (D. Fisher and I.A. Sutherland, eds.), Plenum Press, 1989, pp. 463-470.

Van Alstine, J. M., Bamberger, S., Harris, J. M., Snyder, R. S., Boyce, J. F., and Brooks, D. E., "Phase Partitioning Experiments on Shuttle Flight STS-26," in *Proceedings of VII European Symposium on Materials Sciences under Microgravity*, ESA SP-295, 1990, pp. 399-408.

Van Alstine, J.M., Harris, J.M., Snyder, R.S., Curreri, P.A., and Bamberger, S., "Behavior of Two-Phase Polymer Systems in Microgravity," in *The Marshall Space Flight Center KC-135 Microgravity Test Program 1984 to 1986* (R.E. Shurney, ed.), NASA TM-4059, 1988.

Van Alstine, J.M., Herren, B.J., Snyder, R.S., Shafer, S.G., and Harris, J.M., "Polymer Coatings Reduce Electroosmosis," NASA Tech Brief, 1989, Volume 13, p. 62.

Van Alstine, J.M., Snyder, R.S., , Harris, J.M., and Brooks, D.E., "Affinity Electrophoresis Using Ligands Attached to Polymers," NASA Tech Brief, 1990, Volume 14, p. 95.

Zimmermann, U., Klock, G., Gessner, P., Sammons, D.W., and Neil, G.A., "Microscale Production of Hybridomas by Electrofusion," Biophys. Biochim. Acta, 1991 (in press).

Zukoski, C. F. and Saville, D. A., "Electrokinetic Properties of Particles in Concentrated Suspensions: Heterogeneous Suspensions," J. Colloid Interface Sci., in press.

Glasses and Ceramics

Chen, A., Neilson, G.F., and Weinberg, M.C., "Glass-Forming Ability of a Calcium Niobate Composition by Sol-Gel and Conventional Preparation Methods," J. Non-cryst.. Solids 121, 158 (1990).

Weinberg, M.C., "Crystal Growth and Interfacial Transport in Classical Nucleation Theory," Phys. Chem. Glasses 31, 44 (1990).

Weinberg, M.C., "The Quantitative Determination of the Effectiveness of Nucleating Agents," J. Non-cryst. Solids 122, 139 (1990).

Weinberg, M.C., The Effect of Multiple Nucleation Events on Heterogeneous Nucleation Rates," J. Chem. Phys. 92, 7515 (1990).

Weinberg, M.C. and Kapral, R., "Phase Transformations in Finite Inhomogeneously Nucleated Systems," J. Chem. Phys. 91, 7146 (1989).

Weinberg, M.C., Uhlmann, D.R., and Zanotto, E.D., "On the 'Nose Method' of Calculating Critical Cooling Rates for Glass Formation," J. Am. Ceram. Soc. 72, 2054 (1989).

Weinberg, M.C., Zelinski, B.J., Uhlmann, D.R., and Zanotto, E.D., "On Critical Cooling Rates for Glass Formation," J. Non-cryst. Solids 123, 90 (1990).

Weinberg, M.C., Kondos, P.A., and Subramanian, R.S., "The Shrinkage of a Rising Gas Bubble Containing a Diffusing and Non-Diffusing Gas," Glass Technol. 31, 72 (1990).

Weinberg, M.C. and Subramanian, R.S., "Containerless Measurement of Liquid-Liquid Surface Tension of a Demixing Lead Borate Composition in Space," J. Non-cryst. Solids, 1990 (accepted).

Weinberg, M. C. and Zanotto, E. D., "Calculation of the Volume Fraction Crystallized for Non-Isothermal Transformations," Phys. Chem. Glasses 30, 110 (1989).

Zanotto, E. D. and Weinberg, M. C., "Trends in Homogeneous Crystal Nucleation in Oxide Glasses," Phys. Chem. Glasses 30, 186 (1989).

Combustion Science

Abbud-Madrid, A. and Ronney, P.D., "Effects of Radiative and Diffusive Transport on Premixed Flames near Flammability Limits," in *Proceedings of Twenty Third International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Altenkirch, R.A. and Vedha-Nayagam, M., "Opposed-Flow Flame Spread and Extinction in Mixed-Convection Boundary Layers," in *Proceedings of Twenty-Second International Symposium on Combustion*, The Combustion Institute, 1989, pp. 1495-1500.

Altenkirch, R.A. and Bhattacharjee, S., "Opposed-Flow Flame Spread with Iplications for Combustion at Microgravity," AIAA Progress in Astronautics and Aeronautics 130, 723-740 (1990).

Baum, H., Kashiwagi, T., and Di Blasi, C., "Radiative Pyrolysis of Thin Fuelds in a Microgravity Environment," in *Proceedings of 1989 Eastern States Combustion Meeting*, October 1989.

Berlad, A. L., "Low Gravity Combustion Through Clouds of Particulates," in *Materials and Fluid Science in Low Gravity* Volume 130 (J.H. Koster, ed.), AIAA, 1990.

Berlad, A.L., "Combustion of Particle Clouds," Progress in Energy and Combustion Science, 1991 (in press).

Berlad, A.L., Tangirala, V., Seshadri, K., Facca, L.T., Ogrin, J., and Ross, H., "Particle Nonuniformity Effects on Particle Cloud Flames in Low Gravity," AIAA Paper 91-0718, *29th Aerospace Sciences Meeting*, Reno, January 1991.

Bhattacharjee, S., Altenkirch, R.A., Srikantaiah, N., and Vedha-Nayagam, M., "A Theoretical Description of Flame Spreading over Solid Combustibles in a Quiescent Environment at Zero Gravity," Comb. Sci. & Techn. 69, 1-15 (1990).

Bhattacharjee, S., Altenkirch, R.A., "Radiation-Controlled, Opposed-Flow Flame Spread in a Microgravity Environment," in *Proceedings of Twenty-Third International Symposium on Combustion*, The Combustion Institute, 1990 (to appear).

Bhattacharjee, S., Altenkirch, R.A., "The Effect of Surface Radiation on Flame Spread in a Quiescent, Microgravity Environment," Comb. & Flame, 1990 (to appear).

Bhattacharjee, S., Altenkirch, R.A., Olson, S.L., and Sotos, R.G., "Heat Transfer to a Thin Solid Combustible in Flame Spreading at Microgravity," J. Heat Transf., 1990 (submitted).

Buckmaster, J. D., Joulin, G., Ronney, P. D., "Effects of Heat Loss on the Structure and Stability of Flame Balls," Comb. & Flame 79, 381-392 (1990).

Buckmaster, J. D., Joulin, G., Ronney, P. D., "Structure and Stability of Non-adiabatic Flame Balls. II. Effects of Far-Field Losses," Comb. & Flame, 1990 (in press).

Cantwell, E.R. and Fernandez-Pello, A.C., "Smoldering Combustion under Low Gravity Conditions," AIAA Paper 90-0648, *28th Aerospace Sciences Meeting*, Reno, 1989.

Cho, S.Y., Choi, M.Y., and Dryer, F.L., "Extinction of a Free Methanol Droplet in Microgravity," in *Proceedings of Twenty Third International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Cho, S.Y., Yetter, R.A., and Dryer, F.L., "Computer Model for Chemically Reactive Flow with Complex Chemistry/Multi-component Diffusion/Heterogeneous Processes," J. Comput. Phys., 1990 (submitted).

Choi, M.Y., Dryer, F.L., and Haggard J.B., "Some Further Observations on Micro-gravity Droplet Combustion in the NASA Lewis Drop Tower Facilities," in *Proceedings of Third International Colloquium on Drops and Bubbles*, (T. Wang, ed.), AIP, 1989.

Choi, M.Y., Dryer, F.L., and Haggard J.B., "Observations of a Slow Burning Regime for Hydrocarbon Droplets: n-Heptane/Air Results," in *Proceedings of Twenty Third International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Curtis, E. W. and Farrell, P. V., "Droplet Vaporization in a Supercritical Microgravity Environment," Acta Astron 13 (1988).

Curtis, E. W., Hartfield, J., and Farrell, P. V., "Microgravity Vaporization of Liquid Droplets", in *Proceedings of Third International Colloquium on Droplets and Bubbles,* September 1988 (in press).

Dunsky, C.M. and Fernandez-Pello, A.C., "Gravitational Effects on Cellular Flame Structure," in *Proceedings of Twenty Third International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Farmer, J. N., Ronney, P. D.: "A Numerical Study of Unsteady Nonadiabatic Flames," Comb. Sci. & Techn. 73, 555-574 (1990).

Haggard, J.B., Brace, M.H., Dryer, F.L., Choi, M.Y., Williams, F.A., and Card, J., "Mathematical Modeling of Liquid Droplet Combustion in Microgravity," in *Proceedings of Seventh International Conference on Mathematical and Computer Modeling*, 1990 (to appear).

Haggard, J.B., Brace, M.H., Dryer, F.L., Choi, M.Y., Williams, F.A., and Card, J., "N-Decane-Air Droplet Combustion Experiments in the NASA-Lewis 5 Second Zero-Gravity Facility," AIAA Paper No. 90-0649, *28th Aerospace Sciences Meeting*, Reno, January 1990.

Jackson, G.S., Avedisian, C.T., and Yang, J.C., "Combustion of Unsupported Methanol/Toluene Mixture Droplets at Low Gravity," Paper No. 85, *Eastern State Section Meeting of the Combustion Institute*, Orlando, 1990.

Kushida, G., Baum, H., and Kashiwagi, T., "Radiative Ignition of Thin Cellulosic Sheet in a Microgravity Environment," in *Proceedings of 1990 Eastern States Combustion Meeting*, December 1990.

Kushida, G., Baum, H., and Kashiwagi, T., "Heat and Mass Transport from Thermally Degrading Thin Cellulosic Material in a Microgravity Environment," J. Heat Transfer, 1990 (submitted).

Newhall, J.L., Fernandez-Pello, A.C., and Pagni, P.J., "Experimental Observations of the Effect of Pressure and Buoyancy on Cellulose Co-current Smoldering," J. Fire & Mat., 1990 (in press).

Olson, S.L., "Mechanisms of Microgravity Flame Spread over a Thin Solid Fuel: Oxygen and Opposed Flow Effects," Comb. Sci. & Tech., 1991 (to appear).

Patniak, G. and Kailasanath, K., "Cellular Structure of Lean Hydrogen Flames in Microgravity," AIAA Paper 90-0041, *Proceedings of 28th Aerospace Sciences Meeting*, Reno, 1990.

Patniak, G. and Kailasanath, K., "Effect of Gravity on the Stability and Structure of Lean Hydrogen-Air Flames," in *Proceedings of 23rd International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Patniak, G., Kailasanath, K., and Oran, E.S., "Effect of Gravity on Flame Instabilities in Premized Gases," AIAA Journal, 1990 (accepted).

Ronney, P. D., "Near-Limit Flame Structures at Low Lewis Number," Comb. & Flame 82, 1-14 (1990).

Ross, H.D., Schiller, D.N., Sirignano, W.A., and Disimile, P., "Dynamics of Cylindrically Enclosed Fluids Heated Centrally from Above," J. Thermophys. and Heat Transfer, 1990 (submitted).

Ross, H.D., Sotos, R.G., and T'ien, J.S., "Observation of Candle Flames under Various Atmospheres in Microgravity," Comb. Sci. & Tech., in press.

Sacksteder, K.R., "The Implications of Experimentally Controlled Gravitational Accelerations for Combustion Science," in *Proceedings of 23rd International Symposium on Combustion*, The Combustion Institute, 1990 (in press).

Schiller, D.N., Abramzon, B., and Sirignano, W.A., "Enclosed Liquid/Gas System Heated Nonuniformly from Above: Variable Properties and Vaporization Effects," in *Heat Transfer Phenomena in Radiation*, Combustion, and Fires, HTD-Vol. 106, 1989, pp. 389-398.

Schiller, D.N. and Sirignano, W.A., "Ignition Delay of a Gas Mixture Above a Liquid Fuel Pool," Paper No. 91-0717, *29th Aerospace Sciences Meeting*, Reno, January 1991.

Shaw, B.D., "Studies of Influences of Liquid-Phase Species Diffusion on Spherically Symmetric Combustion of Miscible Binary Droplets," Comb. & Flame 81, 277-288 (1990).

Shaw, B. D., and Williams, F. A., "Theory of Influence of Low Volatility, Soluble Impurity on Spherically Symmetric Combustion of Fuel Droplets," Int. J. Heat & Mass Transf. 33, 301-317 (1990).

T'ien, J.S., The Possibility of a Reversal of Material Flammability Ranking from Normal Gravity to Microgravity," Comb. & Flame 80, 335-357 (1990).

Tsau, F.H., Elghobashi, S.E., and Sirignano, W.A., "Effects of G-Jitter on a Thermal, Buoyant Flow," Paper 90-0653, *28th Aerospace Sciences Meeting*, Reno, 1990.

Tsau, F.H., Elghobashi, S.E., and Sirignano, W.A., "Effects of G-Jitter on a Thermally Buoyant Flow," J. Thermophys. and Heat Transfer, submitted.

Williams, F.A., "Combustion Phenomena in Relationship to Microgravity Research," Micro. Sci. Tech. 3(3), 154-161 (1990).

T'ien, J.S., "The Possibility of a Reversla of Material Flammability Ranking from Normal Gravity to Microgravity," Comb. & Flame 80, 355-357 (1990).

Williams, F.A., "The Role of Microgravity Research in Contributing to the Theoretical Foundations of Combustion," in *Proceedings of VII European Symposiumon Materials and Fluid Sciences under Microgravity,* ESA SP-295, 1990, pp. 453-457.

Williams, F.A., "Combustion Phenomena in Relationship to Microgravity Research," Micro. Sci. & Tech. 3(3), 154-161 (1990).

Yang, J.C., Jackson, G.S., and Avedisian, C.T., "Combustion of Unsupported Methanol/Dodecanol Mixture Droplets at Low Gravity," in *Proceedings of 23rd International Symposium on Combustion*, The Combustion Institute, 1990, in press.

Experimental Technology, Facilities and Instrumentation

Allen, J. and Wang, T. G., "High Efficiency Acoustic Chamber," J. Acoust. Soc. Am. 87 (Suppl. 1), S21 (1990).

Alter-Gartenberg, R., Huck, F.O., and Narayanswamy, R., "Image Recovery from Edge Primitives," Opt. Soc. Am. A 7, 898-911 (1990).

Chang, R. F. and Cezairliyan, A., "The Use of a Pyroelectric Detector for Rapid Measurements of Total Radiant Power," Int. J. Thermophys., 1988 (in press).

Fecht, H.J. and Johnson, W.L., "Conceptual Approach for Non-Contact Calorimetry in Space," Rev. Sci. Instrum., 1990 (in press).

Fripp, A.L., Debham, W.J., Simchick, R.T., and Barber, P.G., "Radiographic Instrumentation for DPM Experiments," in *Proceedings of Containerless Experimentation in Microgravity Workshop*, JPL Publication 90-30, 1990, p. 445.

Hofmeister, W.H., Bayuzick, R.J., and Robinson, M.B., "Dual Purpose Pyrometer for Temperature and Solidification Velocity Measurement," Rev. Sci. Instrum. 61, 2220 (1990).

Rathz, T.J., Robinson, M.B., Hofmeister, W.H., and Bayuzick, R.J., "The Marshall Space Flight Center Drop Tube Facility," Rev. Sci. Instrum. 61, 3846 (1990).

Rathz, T.J. and Robinson, M.B., "The NASA/Marshall Space Flight Center Drop Tube Users Manual," NASA TM-100392, 1990.

Rhim, W. K., Chung, S. K., and Elleman, D. D., "Experiments on Rotating Liquid Charged Drops," in *Proceedings of Third International Colloquium on Drops and Bubbles*, 1989 (in press).

Rhim, W. K., Chung, S. K., and Elleman, D. D., "Electrostatic Levitators and Drop Dynamics Experiments," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA, 1990, pp. 629-638.

Rhim, W. K. and Chung, S. K., "Development of Containerless Protein Crystal Growth Technology," in *Proceedings of Third International Conference on Crystallization of Biological Macromolecules*, 1989 (in press).

Robinson, M.B., Bayuzick, R.J., and Hofmeister, W.H., "Review of Drop Tube and Drop Tower Facilities," in *Space Commercialization: Platforms and Processing* (R. Shahroki, G. Hazelrigg, and R. Bayuzick, eds.), AIAA, 1990, p. 179.

Rogers, M.J.B., Alexander, J.I.D., and Snyder, R.S., "Analysis Techniques for Residual Acceleration Data," NASA TM-103507, July 1990.

Rogers, M.J.B. and Alexander, J.I.D., "Analysis of Spacelab 3 Residual Acceleration Data using a Prototype Data Reduction Plan," J. Spacecraft & Rockets, submitted.

Rogers, M.J.B. and Alexander, J.I.D., "A Strategy for Residual Acceleration Data Reduction and Dissemination," Adv. Space Res., 1990 (submitted).

Rogers, M.J.B. and Alexander, J.I.D., "Cross-Correlation Analysis of On-Orbit Residual Acceleration in Spacelab," *29th Aerospace Sciences Meeting*, January 1991.

Rudnick, J. and Barmatz, M., "Oscillational Instabilities in Single-Mode Acoustic Levitators," J. Acoust. Soc. Am. 87, 81 (1990).

Sridharan, G., Chung, S. K., Elleman, D. D., and Rhim, W. K., "Optical Sample-Position Sensing for Electrostatic Levitation," in *Proceedings of SPIE Space Material Processing Conference*, 1989 (in press).

Steiner, B., Dobbyn, R.C., Black, D., Burdette, H., Spal, R., Simchick, R., and Fripp, A.L., "High Resolution Diffraction Imaging of Lead Tin Telluride Grown in Microgravity on Space Shuttle STS 61A and on the Ground," J. Cryst. Growth, 1990 (submitted).

Weber, J.K.R., Schiffman, R.A., Krishnan, S., and Nordine, P.C., "Containerless Processing and Property Measurements of High Temperature Liquids and Solids," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA, 1990, pp. 639-644.

General Studies and Surveys

Low Gravity Fluid Dynamics and Transport Phenomena, Volume 130, Progress in Astronautics and Aeronautics (J.N. Koster and R.L. Sani, eds.), AIAA, 1990.

Ott, R.H. and Sokolowski, R.S., "United States Microgravity Programs," Micro. Sci. & Tech. 3(3), 132-137 (1990).

STEP Assessment Study Report, ESA Document SCI (91) 4, February 1991.

B. EUROPEAN PROGRAM

Electronic Materials

Baumgartl, J., Gewald, M., Rupp, R., Stierlen, J., and Muller, G., "The Use of Magnetic Fields and Microgravity in Melt Growth of Semiconductors: A Comparative Study," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 47-58.

Benz, K.W., "Factors Controlling Crystal Perfection during Growth under Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 59-62.

Cadoret, R., Brisson, P., and Magnan, A., "HgI_2 Nucleation Experiments Performed in the SL1 and SL3 (Space Laboratory) Flights," Nucl. Instrum. & Methods Phys. Res. A 283, 339-347 (1989).

Camel, D and Tison, P., "Semi-confined Bridgman Growth of Ga-doped Germanium in MASER-2," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 63-68.

Danilewsky, A.N. and Benz, K.W., "InP Growth from In Solutions under Reduced Gravity," J. Cryst. Growth 97, 571 (1989).

Danilewsky, A.N., Benz, K.W., and Nishinaga, T., "Growth Kinetics in Space- and Earth-grown InP and GaSb Crystals," J. Cryst. Growth 99, 1281 (1990).

Danilewsky, A.N. and Benz, K.W., "Crystal Growth in Mirror Heaters: Time Markers by Lamp Pulses," J. Cryst. Growth 106, 273 (1990).

Harter, I., Duffar, T., and Dusserre, P., "Use of the 'de-wetting' Phenomenon for High Quality Semiconductor Growth in Space," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 69-74.

Muller, G., "A Comparative Study of Crystal Growth Phenomena under Reduced and Enhanced Gravity," in *Proceedings of Ninth International Crystal Growth Conference*, Sendai, Japan, 1989 (in press).

Ribet, M., Leon, S., Lefaucheux, F., and Robert, M.C., "Study of Ferroelastic Domains in HTMA Crystals at the Ferro-electric-ferroelastic Transition," J. Appl. Cryst. 23, 277 (1990).

Weber, W., Neumann, G., and Muller, G., "Stabilizing Influence of the Coriolis Force During Melt Growth on a Centrifuge," J. Cryst. Growth, 1989 (in press).

Zappoli, B., Mignon, C., Launay, J.C., and Debegnac, H., "Germanium Epitaxial Growth in Closed Ampoules, II. Numerical Modelling," J. Cryst. Growth 94, 783 (1989).

Metals, Alloys, and Composites

Bewersdorff, A. and Egry, I., "Containerless Processing in Space," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 625-628.

Bilgram, J.H. and Hurlimann, E., "Dendritic Solidification of Rare Gases," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 173-182.

Billia, B., Double-Diffusive Convection during the Solidification of Pb-Tl Alloys," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 209-218.

Billia, B., Jamgotchian, H., and Trivedi, R., "Cellular and Dendritic Regimes in Directional Solidification. Microstructural Stability Diagram," J. Cryst. Growth 106, 410 (1990).

Billia, B., Jamgotchian, H., and Trivedi, R., "Microstrcutural Transitions during Directional Solidification of a Binary Alloy," in *New Trends in Nonlinear Dynamics and Pattern Forming Phenomena: The Geometry of Nonequilibrium* (P. Coullet and P. Huerre, eds.), Plenum, 1990, p. 343.

Billia, B., Jamgotchian, H., and Thi, H-N., "Array Disorder, Pattern Selection and Local Dendritic Transition in Cellular Directional Solidification," in *Nonlinear Phenomena Related to Growth and Form* (M. Ben Amar, P. Pelce, & P. Tabeling, eds.), Plenum, 1990 (in press).

Billia, B., Jamgotchian, H., and Trivedi, R., "Tip Undercooling during Cellular Solidification of a Binary Alloy," J. Cryst. Growth, 1990 (submitted).

Billia, B., Jamgotchian, H., and Thi, H-N., "Statistical Analysis of the Disorder of 2D-Cellular Arrays in Directional Solidification," Met. Trans. A, 1990 (submitted).

Billia, B., Jamgotchian, H., and Trivedi, R., "The Deep Cell - Dendrite Transition in Directional Solidification of a Binary Alloy," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 189-192.

Cochrane, R. F., Herlach, H. M., and Willnecker, R., "Grain Refinement Produced by Solidification into Undercooled Melts," in *Proceedings of Indo-U.S. Workshop on Metastable Microstructures,* 1989 (in press).

Cochrane, R. F. and Herlach, H. M. "Grain Refinement Produced by Solidification into Undercooled Melts," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 147-154.

Drevet, B., Camel, D., and Favier, J.J., "Solute Boundary Layer and Convection in Solidification of Eutectic Alloy," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 101-108.

Duffar, T., Potard, C., and Dusserre, P., "Growth Analysis of the InSb Compound by a Calorimetric Method in Microgravity, Results of the Spacelab-D1 Experiment," J. Cryst. Growth, 1987 (in press).

Egry, I., Feuerbacher, B., Lohofer, G., and Neuhaus, P., "Viscosity Measurement in Undercooled Metallic Melts," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 257-260.

Froyen, L., De Bondt, S., and Deruyttere, A., "Behaviour of a Silver-tungsten Metallic Suspension in Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 141-146.

Feuerbacher, B. and Herlach, D.M., "Containerless Processing of Metals in Space," IAF 89-429, *40th Congress of the International Astronautical Federation*, Malaga, Spain, 1989.

Gerritsma, G.J. and Rogalla, H., "Preparation of High-T_c Superconductors under Microgravity," Micro. Sci. & Tech.3(3), 165-167 (1990).

Gillessen, F. and Herlach, D. M., "Thermodynamics of Undercooled Pd-Cu-Si Melts," submitted.

Guerin, R., Billia, B., and Haldenwang, P., "Solutal Instability during Directional Solidification of a Binary Alloy in a Cylinder," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 161-165.

Guerin, R., Billia, B., and Haldenwang, P., "Onset of Solutal Convection during Directional Solidification of a Binary Alloy in a Cylinder," Phys. Fluids A, 1990 (submitted).

Hennenberg, M. and Billia, B., "Further Analysis of the Analogy Between Cellular Solidification and Viscous Fingering," J. Physique 52, 1990 (in press).

Herlach, D. M. and Willnecker, R., "Undercooling and Nucleation," in *Rapidly Solidified Alloys* (H.H. Liebermann, ed.), in press.

Jafors, A. and Fredriksson, H., "On the Behaviour of TiC Particles in the Al-rich Corner of the Al-Ti-C Phase Diagram," Micro. Sci. & Tech. 3(4), 216-221 (1991).

Jamgotchian, H., Billia, B., and Thi, H-N., "Organisation des Reseaux Bidimensionnels de Cellules de Solidification Dirigee," Annales de Chimie - Science des Materiaux, 1990 (in press).

Kreis, J., Herlach, D. M., Alexander, H., and Weiss, W., "The Solidification Behaviour of Al-Mn Melts," submitted.

Laakmann, J., Schmitz, G.J., Ecke, H., and Wei ," "Rapid Solidification of Al-Fe-Cu Alloys," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 97-100.

Morgand, P., Camel, D., and Favier, J.J., "Segregations in Dilute Denritic Alloys Solidifed at Low Rates," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 183-188.

Schleip, E., Herlach, D. M., and Feuerbacher, B., "Controlled Phase Triggering in Metastable Solidification of Metals," submitted.

Thi, H.-N., Billa, B., and Capella, L., "Cellular Arrays during Upward Solidification of a Binary Alloy," J. Physique 51, 625 (1990).

Willnecker, R., Herlach, D. M., and Feuerbacher, B., "Free Dendritic Growth in Levitation Undercooled Ni and Cu-Ni Melts," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 193-196.

Willnecker, R., Herlach, D. M., and Feuerbacher, B., "Grain Refinement Induced by a Critical Crystal Growth Velocity in Undercooled Melts," submitted.

Fluids, Interfaces, and Transport

Azouni, M.A., Kalita, W., and Yemmou, M., "On the Particle Behaviour in Front of Advacing Liquid-Ice Interface," J. Cryst. Growth 99, 201 (1990).

Balchin, I. H., Boucher, E. A., and Evans, M.J.B., "Capillary Phenomena, Part 30. The Properties of Heavy Liquid Lenses at Fluid/Fluid Interfaces," J. Colloid & Interface Sci., 1988 (in press).

Bauer, H. F., "Damped Response of an Axially Excited Rotating Liquid Bridge under Zero-Gravity," Acta Mech. 79, 295-301 (1989).

Bauer, H. F., "Response of a Viscous Liquid Column to Axial Excitation in Zero-Gravity," ZAMM 70, 359-369 (1990).

Bauer, H. F., "Vibrational Behavior of a Viscous Column with a Free Liquid Surface," Z. Flugwiss. Weltraumf. 13, 248-253 (1989).

Bauer, H. F., "Response of a Liquid Column to One-Sided Axial Excitation in Zero-Gravity," Forsch. Ing. Wes. 56(1) (1990).

Bauer, H. F., "Axial Response and Transient Behavior of a Cylindrical Liquid Column in Zero Gravity," Z. Flugwiss. Weltraumf. 14, 174-182 (1990).

Bauer, H.F., "Response of a Liquid Column to Unequal Counter-directional Excitation under Zero Gravity," Micro. Sci. & Tech. 3(1), 34-40 (1990).

Bauer, H.F., "Oscillatory Response of a Liquid Column to Counter-rotational Excitation," J. Sound & Vibration 142, 125-133 (1990).

Bauer, H.F., "Response of Differently Axially Excited Spinning Liquid Columns," Acta Mech. 84, 155-173 (1990).

Bauer, H. F., "Response of a Viscous Liquid Column to Various Pitch-excitations," Acta Astron. 21, 553-569 (1990).

Bauer, H. F., "Response of an Annular Cylindrical Liquid Column to Various Axial Excitations in Zero Gravity," Forsch. Ing. Wes. 56(6) (1990).

Bauer, H. F., "Minimization of Marangoni Convection," Le Forum de Genie Mecanique, 1990.

Bauer, H. F. and Eidel, W., "Small Amplitude Liquid Oscillations in a Rectangular Container under Zero Gravity," Z. Flugwiss. Weltraumf. 14, 1-8 (1990).

Bauer, H.F. and Eidel, W., "Linear Liquid Oscillations in Cylindrical Container under Zero Gravity," Appl. Micro. Tech. 2(4), 212-220 (1990).

Bauer, H.F. and Eidel, W., "Vibrations of a Cylindrical Liquid Column under the Influence of a Steady Axial Microgravity Field," Micro. Sci. & Tech. 3(4), 238-245 (1991).

Ben Hadid, H., Paure, P., and Roux, B., "Buoyancy and Thermocapillary-driven Flows in Shallow Open Cavities," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 309-314.

Beysens, D., "Recent Development in Critical and Near-critical Point Phenomena," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 355-368.

Bisch, C., "Analogies of Mechanical Behaviour Between Liquids Studied in Microgravity and Solids. Applications to Loaded Spheres," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 531-539.

Bontoux. P., Smutek, C., Roux, B., Hardin, G., Sani, R., and Crespo del Arco, E., "Three-dimensional Buoyancy-Driven Flows in Cylindrical Cavities with Differentially Heated End Walls, Part 2: Vertical Cylinders," J. Fluid Mech., 1989 (in press).

Castillo, J.L., Garcia-Ybarra, P.L., and Rosner, D.E., "Stability of a Deposit Growing by Thermal Diffusion," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 219-229.

Chu, X-L. and Velarde, M. G., "The Nonlinear Evolution Equations for Space Modulated Interfacial Oscillations Induced and Sustained by the Marangoni Effect," Phys. Lett. A, 1989 (in press).

Chu, X-L. and Velarde, M. G., "Onset of KdV Solitons in Marangoni-Benard Convection," Phys. Rev. Lett, 1989 (in press).

Chun, Ch-H., Raake, D., and Hansmann, G., "Oscillating Convection Modes in the Surroundings of an Air Bubble under a Horizontal Heated Wall," Exp. in Fluid, 1990 (in press).

Crespo de Arco, E., Pulicani, J. P., Randriamampianina, A., Extremet, G. P., and Bontoux, P., "Complex Flow Regimes in the Melt of a Bridgman Model. Multiple, Steady and Time-dependent Solutions in Two- and Three-dimensional Low-Pr Convection," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 219-229.

Crespo de Arco, E., Pulicani, J. P., and Bontoux, P., "Simulations and Analysis of Time-dependent Convection in Low-Pr Fluids," Int. J. Physicochem. Hydrodyn., 1989 (in press).

Croll, A., Muller, S. W., and Nitsche, R., "The Critical Marangoni Number for the Onset of Time-Dependent Convection in Silicon," Mat. Res. Bull. 24, 995 (1989).

Croll, A., Muller, S. W., and Nitsche, R., "Transition from Steady to Time-Dependent Marangoni Convection in Partially Coated Silicon Melt Zones," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 263-269.

Croll, A., Danilewky, A., and Benz, K.W., "Factors Controlling the Dopant Incorporation in Semiconductor Crystals," in *Proceedings of XI Symposium on Indistrial Crystallization*, 1990, pp. 635-640.

Croll, A., Muller-Sebert, W., Benz, K.W., and Nitsche, R., "Natural and Thermocapillary Convection in Partially Confined Silicon Melt Zones," *Appl. Micro. Tech.* 3(4), 204-215 (1991).

Delgado, A. and Rath, H. J., "Handhabung von Fluiden in der Schwerelosigkeit mittels Induzierter Rotation," ZAMM, 1988 (in press).

Djennaoui, N., Heraudeau, F., Guenoun, D., Beysens, D., and Zappoli, B., "Thermal Transport in a Pure Fluid near a Critical Point," Acta Astron., 1991 (to appear).

Dupont, O., Queeckers, P., Van Vaerenbergh, S., and Legros, J.C., "The AFPM-MBI Experiments during Spacelab D2 Mission: Results of the Preparatory TEXUS 21 Flight," Microgravity Q. 1, 57-63 (1990).

Durr, H. M. and Siekmann, J., "Numerical Studies of Fluid Oscillation Problems by Boundary Integral Techniques," Acta Astron., 1986 (in press).

Eckler, K., Egry, I., and Herlach, D.M., "Measurements of Surface Tension on Levitated Oscillating Metallic Drops," Mat. Sci. & Engr. (to be published).

Egry, I., "Surface Tension Measurements of Liquid Metals by the Oscillating Drop Technique," J. Mat. Sci. (to appear).

Egry, I., Feuerbacher, B., Lohofer, G., and Neuhaus, P., "Viscosity Measurement in Undercooled Metallic Melts," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 257-260.

Egry, I., Lohofer, G., and Neuhaus, P., "Surface Tension Measurements of Liquid Metals using Levitation, Microgravity and Image Processing," Int. J. Thermophys. (to be published).

Egry, I., Lohofer, G., and Neuhaus, P., "Surface Tension Measurements of Liquid Metals," in *Advanced Workshop on Capillarity*, Lecture Notes in Physics, Springer (to be published).

Egry, I. and Szekely, J., "The Measurement of Thermophysical Properties using Electromagnetic Levitation," Adv. Space Res. (to be published).

Ehmann, M., Wozniak, G., and Siekmann, J., "Numerical Analysis of the Thermocapillary Migration of a Fluid Particle under Zero Gravity," Archives of Mechanics, 1989 (in press).

Falk, F., "Heterogeneous Nucleation in Liquids Showing a Miscibility Gap," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 443-446.

Feuillebois, F., "Thermocapillary Migration of Two Bubbles," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 331-336.

Fontaine, J. P. and Randriamampianina, A., "Simulation of Buoyancy Driven Flows in a Liquid-encapsulated Czochralski Configuration," Int. J. Physicochem. Hydrodyn., 1989 (in press).

Fontaine, J. P. and Randriamampianina, A., and Bontoux, P., "Numerical Simulation of Flow Regimes in a Liquid-encapsulated Czochralski Configuration," Phys. Fluids, 1989 (in press).

Fontaine, J. P. and Randriamampianina, A., Extrememt, G. P., and Bontoux, P., "Simulation of Steady and Time-dependent Rotation-Driven Regimes in LEC Configuration, Computer Modelling in Crystal Growth from the Melt," J. Cryst. Growth, 1989 (in press).

Ganan, A. and Barrero, A., "Free Oscillations of Liquid Captive Drops," Micro. Sci. Tech. 3(2), 70-86 (1990).

Garcia-Sanz, J. and Jimenez-Ferandez, J., "The Amplitude of th Surface Defletion in Benard-Rayleigh-Marangoni Convection," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 299-304.

Guenoun, P., Beysens, D., and Robert, M., "Dynamics of Wetting and Phase Separation" Phys. Rev. Lett. 65, 19 (1990).

Guenoun, D., Beysens, D., and Robert, M., "Dynamics of Interfaces Near a Wall during Phase Separation," Physica, 1991 (to appear).

Hocking, L.M., "Capillarity in Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 375-380.

Kirschbaum, E., Merkens, W., Rejek, E., Richter, J., and Vogt, M., "Microgravity Effects on Ultrasonic Absorption in Molten Salts," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 481-484.

Klein, H., Schmitz, G., and Woermann, D., "Early Stages of Phase Separation of a Single-Component Fluid at the Critical Point," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 369-371.

Lamprecht, R., Schwabe, D., and Scharmann, A., "Thermocapillary and Buoyant Convection in an Open Cavity under Normal and Reduced Gravity," J. Fluid Mech., 1988 (submitted).

Langbein, D., "The Shape and Stability of Liquid Menciscі in Solid Edges," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 421-428.

Langbein, D., Heide, W., and Gro bach," Parabolic Flight Experiments on Wetting, Stability and Coagulation," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 389-398.

Langbein, D., Gro bach, R., and Heide, W., "Parabolic Flight Experiments on Fluid Surfaces and Wetting," Appl. Micro. Tech. 2(4), 198-211 (1990).

Legros, J.C., Dupont, O., Queeckers, S., Van Vaerenbergh, D., Schwabe, D., "Thermodynamical Instabilities and Capillary Flows," *Low-Gravity Fluid Dynamics and Transport Phenomena*, Volume 130 (J.N. Koster and R.L. Sani, eds.), AIAA, 1990, pp. 1-36.

Liggieri, L., Rando, N., Ricci, E., and Passerone, A., "M.I.T.E. - MASER 4 Experiment. Measurement of Interfacial Tension in Microgravity Conditions," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 409-412.

Liggieri, L., Ravera, F. and Passerone, A., "Drop Formation Instabilities Induced by Entrapped Gas Bubbles," J. Colloid & Interface Sci. 140, 436-443 (1990).

Limbourg, M.C. and Georis, Ph., "Preliminary Results of Texus 19 (TEM06-8) Experiment: Marangoni Convection Around a Surface Tension Minimum," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 347-351.

Lopez-Diez, J., "Low-Marangoni Flow-Renolds Numbers Capillary Flow inside a Slender Liquid Bridge," Micro. Sci. & Tech. 3(4), 222-230 (1991).

Martinez, I. and Sanz, A., "Experiments with Long Liquid Columns under Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 413-419.

Meseguer, J., Sanz, A., and Perales, J.M., "Axisymmetric Long Liquid Bridges Stability and Resonances," Appl. Micro. Tech. 2(4), 186 (1990).

Meseguer, J. and Perales, J.M., "A Linear Analysis of G-jitter Effects on Viscous Cylindrical Liquid Bridges," Phys. Fluids A, submitted.

Monti, R. and Fortezza, R., "Oscillatory Marangoni Flow in a Floating Zone: Design of a Telescience," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 285-290.

Nahle, R., Neuhaus, D., Siekmann, J., Wozniak, G., and Srulijes, J., "Separation of Fluid Phases and Bubble Dynamics in a Temperature Gradient - A Spacelab D1 Experiment," Z. Flugwiss. Welt., 1988 (in press).

Passerone, A., "Measuring Surface Tension in Space," Microgravity Quarterly, in press.

Passerone, A., Liggieri, L., Rando, N., Ravera, F., and Ricci, E., "A New Experimental Method for the Measurements of the Interfacial Tensions Between Immiscible Fluids at Zero Bond Number," J. Colloid & Interface Sci., submitted.

Perales, J.M., Sanz, A., and Rivas, D., "Eccentric Rotation of a Liquid Bridge," Appl. Micro. Tech. 2(4), 193-197 (1990).

Perales, J.M., Meseguer, J., and Martinez, I., "Minimum Volume of Axisymmetric Liquid Bridges between Unequal Disks in an Axial Microgravity Field," J. Cryst. Growth, submitted.

Perales, J.M. and Martinez, I., "Theoretical and Experimental Study of the Vibration of Axisymmetric Viscous Liquid Bridges," J. Fluid Mech., submitted.

Perrot, F., Gastaud, F., Guenoun, P., and Beysens, D., "Spinodal Decomposition Patterns in a Isodensity Critical Binary Fluid: Direct Visualization and Light Scattering Analyses," Phys. Rev. A, 1988 (in press).

Petri, B., Delgado, A., and Rath, H.J., "Marangoni Convection in Spherical Drops Driven by Rotationally Symmetrical Temperature Fields under Microgravity," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 321-330.

Pulicani, J. P., Crespo del Arco, E., Randriamampianina, A., Bontoux, P., and Peyret, R., "Spectral Simulations of Oscillatory Convection at Low Prantl Number," Int. J. Num. Meth. Fluids, 1989 (in press).

Ratke, L., "Immiscible Alloys under Microgravity Conditions," in *Proceedings of XXVII COSPAR Conference*, 1988, Adv. Space Res., 1988 (submitted).

Ratke, L., "Simultaneous Sedimentation by Stokes and Marangoni Motion," J. Colloid & Interface Sci., 1988 (submitted).

Ratke, L. and Uffelmann, D., "Simulation of Microgravity Conditions in Dispersions on Earth by Lorentz-Forces," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 525-530.

Ratke, L., Fischmeister, H., and Kneissl, A., "Coarsening of Liquid Zn-Pb Dispersions - Final Evaluation of a Spacelab 1 Experiment," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 135-140.

Ratke, L. and Vogel, H.J., "Grain Boundary Grooving under the Influence of Convective Diffusion," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 497-502.

Rivas, D., "High-Reynolds-number Thermocapillary Flows in Shallow Enclosures," Phys. Fluids A, accepted.

Schneider, S., "Influence of the Prandtl Number on Laminar Natural Convection in a Cylinder Caused by G-Jitter," *J. Cryst. Growth*, 1989 (in press).

Schwabe, D. and Scharmann, A., "Marangoni and Buoyant Convection in an Open Cavity under Reduced and Under Normal Gravity," Adv. Space Res., 1988 (in press).

Schwabe, D., Dupont, O., Queeckees, P., and Legros, J.C., "Experiments on Marangoni-Benard Instability Problems under Normal and Microgravity Conditions," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 291-298.

Schwabe, D., Velten, R., and Scharmann, A., "The Instability of Surface Tension Driven Flow in Models for Floating Zones under Normal and Reduced Gravity," J. Cryst. Growth 99, 1258-1264 (1990).

Schwabe, D., Scharmann, A., and Da, Z., "Prandtl-Number Dependence of the Onset of Thermocapillary Flow in Floating Zones," Adv. Space Res., 1990 (in press).

Siekmann, J. and Schilling, U., "Liquid Sloshing in Axially Symmetric Containers under Microgravity," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 435-442.

Siekmann, J. and Zimmermann, E., "Untersuchungen uber den Dynamischen Randwinkel," ZAMM 70, T351-T353 (1990).

Szymczyk, J. A., "Thermal and Forced Convection in a Rotating Fluid System," Adv. Space Res., in press; *Proceedings of 28th COSPAR Plenary Meeting*, The Hague, 1990.

Szymczyk, J.A.,Siekmann, J., Chun, Ch.H., and Wozniak, K., "Liquid Crystal Tracers as a Method for Thermocapillary Flow Diagnostics," Arch. Mech. 41, 351-360 (1989).

Szymczyk, J.A. and Siekmann, J., "Experimental Investigation of the Thermocapillary Flow Along Cylindrical Interfaces," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 315-320.

Szymczyk, J.A.,Siekmann, J., and Cieslinski, J.T., "Experimental Study of Thermocapillary Convection at a Rotating Liquid-Gas Interface," AIAA Paper No. 90-0410, *28th Aerospace Sciences Meeting*, Reno, January 1990.

Szymczyk, J. A. and Siekmann, J., "Marangoni and Buoyant Convection in a Cylindrical Cell under Normal Gravity," J. Chem. Engr. in press.

Szymczyk, J.A.,Siekmann, J., and Cieslinski, J.T., "Oscillatory Instabilities due to Surface Tension, Buoyancy and Centrifugal Effects in a Rapidly Rotating Liquid Annulus," AIAA Journal, in press.

Szymczyk, J.A.,Siekmann, J., and Cieslinski, J.T., Thermocapillary Flow in a Rapidly, Rotating Cylinder with Free Inner Surface," Arch. Mech., in press.

Tensi, H.M., "Influence of Microgravity on the Morphology of the Directionally Solidified Front in an AlSi-Alloy," Met. Trans. A 19, 2681-2686 (1988).

Tensi, H.M. and Mackrodt, C., "Einflu der Schwerekonvektion auf den Stofftransport vor der Erstarrungsfront einer gerichtet erstarrenden Al-Cu-Legierung," Z. Metallkde. 81, 367-372 (1990).

Tensi, H.M. and Rosch, R., "Thermoconvection at Dendritic-Eutectic Solidification of an AlSi11-Alloy," Research Program of the German Spacelab Mission D-2, 1989, pp. 143-153.

Tensi, H.M., Mackrodt, C., and Rosch, R., "Influence of Microgravity on the Freezing of an Eutectic Volume," in *Proceedings of Ninth International Heat Transfer Conference*, Jerusalem, 1990, pp. 287-292.

Thevenard, D. and Favier, J.J., "Influence of G-jitters on the Solidification of Dilute Alloys," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 243-246.

Van Vaerenbergh, S. and Legros, J.C., "The Kinetics of the Soret Effect," Phys. Rev. A 41, 12 (1990).

Van Vaerenbergh, S., Legros, J.C., and Colinet, P., "Soret Effect and Related Instability Mechanisms," Lecture Notes in Physics, 1990 (in press).

Velarde, M. G. and Chu, X-L., "Waves and Instabilities at Interfaces," in *Phase Transitions in Soft Condensed Matter* (T. Riste, ed.), Plenum Press, 1989 (in press).

Velten, R., Schwabe, D., and Scharmann, A., "Gravity-Dependence of the Instability of Surface-Tension-driven Flow in Floating Drops," in *Proceedings of 7th European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 271-278.

Velten, R., Schwabe, D., and Scharmann, A., "The Periodic Instability of Thermocapillary Convection in Cylindrical Liquid Bridges," Phys. Fluids A, 1990 (in press).

Villers, D. and Platten, J. K., "Oscillatory Marangoni Convection in Acetone: Earth Experiments and Theory," in *Proceedings of 7th European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 305-307.

Villers, D. and Platten, J. K., "Influence of Thermocapillary Convection in Low Pr Fluids," in *Proceedings of GAMM-Workshop on Numerical Simulation of Oscillatory Convection in Low Pr Fluids,"* 1989, in press.

Villers, D. and Platten, J. K., "Influence of the Interfacial Tension Gradient on Thermal Convection in Superimposed Immiscible Liquid Layers," Appl. Sci. Res., in press.

Vreeburg, J.P.B., and van den Dam, R.F., "Effects of Low Bond Number Liquid Motions on Spacecraft Attitude," in *Proceedings of NATO AGARD Conference, Space Vehicle Flight Mechanics*, No. 489, 1990, pp. 30-1-30-13.

Vreeburg, V.P.B., "Comment on the Paper, 'Parabolic Flight Experiments on Fluid Surfaces and Wetting,'" Micro. Sci. & Tech. 3(2), 125 (1990).

Wozniak, G. and Siekmann, J., "The Migration of Droplets in a Temperature Gradient," Acta Astron. 21, 641-646 (1990).

Wozniak, K., Wozniak, G., and Roesgen, "Experimental Investigation of the Thermocapillary Flow Around a Bubble by Means of Laser-Speckle-Velocimetry," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 337-342.

Wozniak, K., Wozniak, G., and Rosgen, T., "Particle-Image-Velocimetry Applied to Thermocapillary Convection," Experiments in Fluids 10, 12-16 (1990).

Zander, R., Dittimann, M., and Schneider, G.M., "Convective Patterns Induced by Phase Separation in Near-isopyn=cnic Liquid Mixtures," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 247-252.

Zappoli, B., "Response of a Solid-Gas Growth Interface to a Homogeneous Time Dependent Acceleration Field," Int. J. Heat Mass Transf. 33, 1829 (1990).

Zappoli, B., "Oscillatory Growth: 1-D Numerical Non-linear Stability Analysis," Acta Astron. 15, 467-470 (1987).

Zappoli, B., "Response of a Solid-Gas Solidification Interface to Bulk Heat Sources," IAF-90-395, *41st Congress of the International Astronautical Federation*, Dresden, 1990.

Zappoli, B., Bailly, D., Garrabos, Y., Le Neindre, B., Guenoun, P., and Beysens, D., "Anomalous Heat Transport in Supercritical Fluids under Zero Gravity by the Piston Effect," Phys. Rev. A 41, 2264 (1990).

Zappoli, B. and Bailly, D., "Transport in a Confined Compressible Fluid under Time-Dependent Volumetric Heat Sources," Phys. Fluids A 2, 1771 (1990).

Zappoli, B. and Bailly, D., "Response of a Solid-Gas Growth Interface to an Increase in Temperature," Int. J. Heat Mass Transf. 33, 1839 (1990).

Biotechnology

Clifton, M.J., Jouve, N., de Balmann, H., and Sanchez, V., "Conditions for Purification of Proteins by Free-Flow Zone Electrophoresis," Electrophoresis 11, 913-919 (1990).

Clifton, M.J., Jouve, N., and Sanchez, V., "Influence of Buoyancy-Driven Convection on Protein Separation by Free-Flow Electrophoresis," Adv. Space Res., 1990 (accepted).

Gaubin, Y., Croute, F., Pianezzi, B., Prevost, M.C., and Soleilhavoup, J.P., "Effects of Hypergravity on Adherent Human Cells," Micro. Sci. & Tech. 3(4), 246-250 (1991).

Hampp, R., Naton, B., Hoffmann, E., and Mehrle, W., "Suspensions of Plant Cells in Microgravity," Micro. Sci. & Tech. 3(3), 168-172 (1990).

Hemmersbach-Krause, R., and Hader, D-P., "Negative Gravitaxis (Geotaxis) of Paramecium - Demonstrated by Image Analysis," Appl. Micro. Techn. 2(4), 221-223 (1990).

Jouve, N. and Clifton, M.J., "Three-dimensional Modelling of the Coupled Flow Field and Heat Transfer in Continuous Flow Electrophoresis," Int. J. Heat Mass Transf., 1990 (accepted).

Plaas-Link, A., "Results of Protein Crystallization Experiments in Microgravity," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 41-44.

Wagner, G. and Linhardt, R., "Crystallization of Membrane Proteins in the COSIMA Concept under Microgravity," Int. J. Micro. Res. & Appl. 2(2), 104-105 (1989).

Wagner, G. and Linhardt, R., "Crystal Growth of the Membrane Protein Bacteriorhodopsin: Heavy-Atom Labelling, and Liquid-Liquid-Diffusion Profiles in Microgravity Experiments," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 35-39.

Glasses and Ceramics

Badets, M.C., Bessada, C., Simon, P., Billard, D., Douy, A., Massiot, D., Rifflet, J.C., Taulelle, F., and Coutures, J.P., "Material Processing and Characterisation of $Y_3Al_5O_{12}$ and Ca Al_2O_4 Glasses Obtained under Contactless Conditions," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 511-518.

Mathes, M. and Schmitz, G.J., "Micro-g Experiment SPASS - Preliminary Results," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 509-510.

Meier, M., Braetsch, V., and Frischat, G.H., "Self Diffusion in Na_2O-Rb_2O-SiO_2 Glass Melts as Obtained by Microgravity Experiments," Am. Ceram. Soc. 73, 2122-2123 (1990).

Meier, M. and Frischat, G.H., "Comparison Between Micro- and Macro-g Interdiffusion Experiments in Glass Melts," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 253-256.

Combustion Science

Chauveau, C. and Gokalp, I., "Experiments on the Burning of n-Heptane Droplets in Reduced Gravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 467-472.

Durox, D. and Prud'homme, R., "Behaviour of Premixed Flames under Paraabolic Flight Conditions," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 461-466.

Ristau, R., Iglseder, H., and Rath, H.J., "Droplet Combustion in Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 473-477.

Weinberg, F.J. and Carleton, F.B., "Electrical Control of Flames in Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 459.

Experimental Technology, Facilities and Instrumentation

Bateman, J.E., Bemrose, C.R., and Hawkesworth, M.R., "The Application of the Rutherford Appleton Positron Camera to Fluid Motion Studies," in *Proceedings of VII European Symposium on Materials Science in Microgravity*, ESA SP-295, 1990, pp. 553-560.

Bedarida, F., Piano, E., and Pontiggia, C., "Measurement of Concentration Profile by Diffraction Techniques," J. Cryst. Growth 106, 217 (1990).

Bedaria, F., Boccacci, P., Dall'Aglio, G.A., Gatti, L., Michetti, L., Pontiggia, C., Solitro, F., and Zefiro, L., "Crystal Growth from Solution Diagnostic Techniques," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 563-568.

Behrle, R. J., Figgemeier, H., Danilewsky, A., and Benz, K. W., "Zone Melting Furnace, Development and Test of a Modular Crystal Growth Facility for g--Applications," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 673-679.

Behrmann, P., "Diagnostic Technology for Microgravity Applications," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 543-548.

Bennett, E., Wilke, D., and Wittmann, K., "Scheduling Space Experiments using Telescience and an Advanced User-Interface," IAF 89-416, *40th Congress of the International Astronautical Federation*, Malaga, Spain, 1989.

Bennett, E., Koerver, W., and Wittmann, K., "From TEXUS to Columbus: MUSC Telescience TOOLS for the Future," IAF 90-015, *41st Congress of the International Astronautical Federation*, Dresden, 1990.

Bewersdorff, A. and Egry, I., "Containerless Processing in Space - Requirement Analysis," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 6625-628.

Biemann, W. and Terracol, J., "Design, Performance, and Experiment Capabilities of the AGHP, ESA's Advanced Gradient Furnace for Spacelab," 41st Congress of the International Astronautical Federation, IAF 90-378, 1990.

Biemann, W., Bottcher, F., Stapelmann, J., Valentian, D., Soreide, A., and Rie elmann, W., "AGHF - The Advanced Gradient Heating Facility," *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 665-672.

Claasen, F., Martin, W., and Stephen, H., "Elli, A Mirror Heating Facility for GaAs Float Zone Experiments," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 681-683.

Clancy, P., "Microgravity Facilities for Columbus," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 599-606.

Clervoy, J.F., Haignere, J.P., Pletser, V., and Gonfalone, A., "Microgravity with Caravelle," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 685-692.

Lenski, H., "Advanced Facilities for Crystal Growth," Micro. Q. 1, 47-52 (1990).

Leonartz, K., Neumann, G., and Schmitz, G.J., "Micro-g Experiment PIETA - Experiment Technique. (Phase Transition in Eutectic Transparent Alloys)," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 661-664.

Lohofer, G., Neuhaus, P., and Egry, I., "TEMPUS - A Facility for Measuring Thermophysical Properties of Undercooled Liquid Metals," High Temp. High Pressure (to be published).

Maltecca, L. and De Ros, V., "Scientific Goals and Design of the EURECA/Solution Growth Facility," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 645-650.

Mary, J., Bernard, Y., Lefaucheux, F., Cadoret, J.P., and Gonzalez, F., "A New Interferometer - HOLIDDO," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 581-586.

Neuhaus, P., Egry, I., Lohofer, G., and Sauerland, S., "Aspects of High Temperature Pyrometry under Ultra High Vacuum," Int. J. Thermophys. (to be published).

Piechotka, M. and Kaldis, E., "Low Temperature Vapour Growth of Crystals in Space. Facility Design Considerations," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 657-660.

Piechotka, M. and Kaldis, E., Behrmann, P., and Stanna, H., "Vapour Transport Rate Measurement Facility for Space," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 587-592.

Protsch, R.W., "EUROTUBE - SAAR a European Drop Shaft Facility," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 699-702.

Rodriguez, P., Sanz, A., Perales, J.M., and Sanz, A.P., "Design and Manufacturing of an APTF to Test Fluid Behaviour in Microgravity Environment," in *Proceedings of IV European Symposium on Space Mechanisms and Tribology*, ESA SP-299, 1990, pp. 299-304.

Sanz-Andres, A., Perales, J.M., Rodriguez de Francisco, P., and Sanz-Lobera, A., "A Plateau Tank Facility (PTF) for Liquid Bridge Experimentation by Using Buoyancy Technique for Microgravity Simulation," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 607-611.

Sill, K.H., Heimann, K., and Roth, M., "Holop D-2, A Holographic Interferometer for Microgravity Research in Space," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 575-579.

Solitro, F., Gatti, L., Bedarida, F., Dall'Aglio, G.A., and Michetti, L., "Multidirectional Holographic Interferometer (MHOI) with Fiber Optics for Study of Crystal Growth in Microgravity," SPIE 1162, 62 (1989).

Solitro, F., Gatti, L., Bedarida, F., Dall'Aglio, G.A., and Michetti, L., "Multidirectional Holographic Interferometer (MHOI) by Fiber Optics for Study of Crystal Growth from Solution in Microgravity," in *Proceedings of Ninth International Conference on Crystal Growth*, Sendai, Japan, 1989, pp. 319-321.

Steinborn, W., Rosner, P., Rastog, A. K., and Loeb, H., "The EUROTUB-30 Dropshaft with Magnetic Propulsion - A New Tool for Low Cost/High Rep Experimentation in Microgravity Preparatory Programme," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 693-698.

Thevenard, D. and Favier, J.J., "Analysis of Accelerometric Data with the Help of Wavelet Transforms: A Prospective Study," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 593-596.

Winter, J. and Hofmann, P., "Holographic Interferometry for Microgravity Application," in *Proceedings of Holographics '90 Conference*, Nuremburg, October 1990.

General Studies and Surveys

Egry, I. and Laakmann, J. (eds)., "Containerless Processing of Metals - Undercooling and Solidification," *Proceedings of International Workshop*, 1989.

Feuerbacher, B., Mirra, C., Napolitano, L.G., and Wittmann, K., "Experience and Concepts in Microgravity User Support," Space Technol. 10, 109-115 (1990).

Jager, K., Eyb, M., and Doukas, H., "Raumkurier: A Mission Opportunity for Recoverable Experiments," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 711-713.

Juste, G.L. and Tizon Pulido, J.M., "Viability to Perform Several Combustion Experiments in a Module of a Sounding Rocket," Micro. Sci. & Tech. 3(2), 121-124 (1990).

Langbein, D., "Quality Requirements for Microgravity Experiments," Micro. Sci. & Tech. 3(3), 138-142 (1990).

Nahle, R., Padeken, D., Schuber, M., and Wittmann, K., "MUSC Support to the D-2 Mission - Experiencies for the Space Station Era," IAF 90-387, *41st Congress of the International Astronautical Federation*, Dresden, 1990.

Schmidt, H.P., Bennet, E., Kaul, G., Wittmann, K., and Putz, C., "Telescience Concept: From TEXUS to Space Station," Space Technol. 10, 121-126 (1990).

Stavrinidis, C., Stark, H., Eilers, D., and Hornung, E., "Microgravity Quality Provided by Different Flight Opportunities," Micro. Sci. & Tech. 3(4), 191-203 (1991).

C. SOVIET PROGRAM

Electronic Materials

Barta, C., Kuhl, R., Trnka, J., Triska, A., and Regel, L.L., "Technological Properties of CSK-1 Crystallizer for Materials Research in Space," Crystal Research and Technology 24, 717-721 (1989).

Barta, C., Fendrych, F., Krcova, E., Trnka, J., and Triska, A., "Directional Solidification of Complex-forming Eutectic Melt of the $PbCl_2$-AgCl Dielectric System under Conditions of Zero, Normal and Increased Gravity," Adv. Space Res. 8(12), 170 (1988).

Barta, C., Triska, A., and Fendrych, F., "Nonequilibrium Directional Solidification of the $PbCl_2$-AgCl Eutectic System in Microgravity Environment," in *Proceedings of XXVII COSPAR Plenary Meeting*, The Hague, 1990, in print.

Popov, A.S., Kostandinov, Matcev, M.D., Alexandrov, A.P., Regel, L.L., and Baturin, N.A., "Phase Analysis of $RbAg_4I_5$ Crystals Grown in Microgravity," Int. J. Micro. Res. & Appl. 3(1), 41-43 (1990).

Regel, L.L., Baturin, N.A., Popov, A.S., Kostadinov, I.Z., and Matcev, M.D., "Growth of Solid Electrolytes from he Melt under Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA SP-295, 1990, pp. 89-93.

Shcherbina-Samoilova, M.B., Hartman, H., Regel, L.L., and Trnka, J., "Growth of the ZnSe Single Crystals by Chemical Transport under Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA SP-295, 1990, pp. 19-21.

Griaznov, V.L., Lebedev, A.P., Nikitin, S.A., Pavlovskii, D.S., and Poleshaev, V.I., "Thermal Convection Structure and Temperature Oscillations in Semiconductor Melts on Earth and in Microgravity. Theory and Experiments," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA SP-295, 1990, pp. 231-236.

Poleschaev, V.I. and Nikitin, S.A., "Inhomogeneities of the Temperature and Concentration Fields Induced by Convection at Low Gravity," in *Proceedings of VII European Symposium on Materials and Fluid Science in Microgravity*, ESA SP-295, 1990, pp. 237-241.

Biotechnology

Bello, M.S. and Polezhaev, V.I., "Fluid Flow in Free Flow Electrophoresis Chamber in Microgravity," Int. J. Micro. Res. & Appl. 3(1), 3-7 (1990).

Bello, M.S. and Polezhaev, V.I., "Thermal Convection and Fluid Flow in Continuous Flow Electrophoresis," Micro. Sci. & Tech. 3(4), 231-237 (1991).

Experimental Technology, Instrumentation and Facilities

Barta, C., Trnka, J., Triska, A., and Rysava, N., "A New Module for the CSK-1 Crystallizer: Thermographic DTA Probe for the Study of Metastable Phase Equilibria under Microgravity Conditions," Adv. Space Res. 8(12), 137-140 (1988).

Barta, C., Triska, A., and Masek, A., "The New Programmable Crystallizer for Materials Processing in Space," *Proceedings of XXVII COSPAR Plenary Meeting*, The Hague, 1990, in print.

D. JAPANESE PROGRAM

Electronic Materials

Isshiki, M., Piechotka, M., and Kaldis, E., "Vapor Growth Mechanism of Hg_2 Crystals. Growth Rate Measurments for the Space Experiment," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 13-18.

Kimura, T., Nishimura, T., Yukimoto, Y., Mizuguchi, K., and Murotani, T., "Vapor Phase Epitaxial Growth of InP by Halogen transport on Earth and under Microgravity Environment," J. Cryst. Growth 99, 1304 (1990).

Kinoshit, K. and Yamada, T., "Conditions for Diffusion-Controlled Steady-State Growth of $Pb_{1-x}Sn_xTe$ under Microgravity," J. Cryst. Growth 99, 1276-1280 (1990).

Kodama, S., Suzuki, Y., Ueda, O., and Ohtsuki, O., "GaAs Solution Growth Experiment in Microgravity," J. Cryst. Growth 99, 1287 (1990).

Kodama, S., Suzuki, Y., Ueda, O., and Ohtsuki, O., "Solution Growth of GaAs Crystal under Microgravity," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 23-28.

Tsukamoto, K., "In Situ Observations of Crystal Growth Processes," in *Proceedings of VII European Symposium on Materials and Fluid Sciences in Microgravity*, ESA SP-295, 1990, pp. 561-562.

Fluids, Interfaces and Transport

Arase, R., Shinoda, H., Takahashi, K., and Adachi, S., "Effect of Surface Contamination on Contact Angles Between Water and Quartz Substrates," Japan Soc. Micro. Appl. 7 (1990).

Arase, R., Shinoda, H., Takahashi, K., and Adachi, S., "Contact Angle Measurements of Molten Tin on Clean Substrates of Crucible Materials," Japan Soc. Micro. Appl. 7 (1990).

Nakamura, S., Hibiya, T., Yamamoto, F., and Yokota, T., "Thermal Conductivity Measurements under Microgravity - Experiments on Board the TEXUS-24 and MU-300 Jet Plane," Japan Soc. Micro. Appl. 7 (1990).

Ohnishi, M., Yoshihara, S., and Azuma, H., "Computer Simulation of Thermocapillary Motion with Surface Deformation," *40th IAF Congress*, Dresden, Germany, IAF-90-400, 1990.

Ohnishi, M., Ogiwara, S., Yoshihara, S., and Azuma, H., "Free Surface Fluid Behavior in a Two-Dimensional Container with Arbitrary Configuration (Computer Simulation and Experiment Using Trop Tower)," Acta Astron. 21, 494-504 (1990).

Ohnishi, M., Yoshihara, S., and Azuma, H., "Computer Simulation of Fluid Flow with Thermocapillary Motion and Surface Deformation," in *Proceedings of Seventeenth International Symposium on Space Technology and Science*, Tokyo, 1990, pp. 2185-2190.

Ohnishi, M., Yoshihara, S., and Azuma, H., "Observation and Simulation of Flow on Soap Film Induced by Concentration Gradient," in *Proceedings of Sixteenth International Symposium on Space Technology and Science*, Sapporo, 1990, pp. 2393-2399.

Glasses and Ceramics

Makihara, M., Hayakawa, J., Ray, C.S., and Day, D.E., "Glass in Microgravity: Melting, Deformation, and Crystallization," in *Proceedings of Seventeenth International Symposium on Space Technology and Science*, Tokyo, 1990, pp. 2119-2123.

Makihara, M., Hayakawa, J., and Komiyama, T., "Glass Preparation under Microgravity," in *Space Commercialization: Platforms and Processing* (F. Shahrokhi, G. Hazelrigg, and R. Bayuzick, eds.), AIAA, 1990, pp. 251-269.

Experimental Technology, Facilities and Instrumentation

Ito, M., Watanable, M., Ishii, M., and Kuriki,K., "Atomic Oxygen Interaction with Spacecraft Materials," Ish. Har. Engr. Rev. 30, 335-339 (1990).

Makihara, M., Hayakawa, J., Komiyama, T., Moriya, Y., and Ikegami, Y., "The Sound Pressure Level Distribution and Peak Following in Acoustic Levitation Furnace," JASMA 7, 135-145 (1990).

Matsumoto, N., Takayanagi, M., Takei, F., Kawase, N., Zaiki, Y., Kitamura, S., and Tanaka, M., "Compact Triaxial Accelerometer System (CTAS)," in *Proceedings of Seventeenth International Symposium on Space Technology and Science*, Tokyo, 1990, pp. 2197-2202.

Oda, T., Aoyama, M., Ogihara, M., Fujii, T., Ikegami, Y., and Kuribayashi, M., "An Electrostatic Levitation by Alternating Quadrupole Field," Ann. Rep. Nishinippon Inst. Tech. 20, 17-26 (1990).

Oda, T., Aoyama, M., Ogihara, M., Fujii, T., Ikegami, Y., and Kuribayashi, M., "On Computer Simulation of a Confinement State of a Charged Steel Ball by a Low Frequency Alternating Three Dimensional Quadrupole," in *Proceedings of 1990 Annual Meeting of Institute of Electrostatics of Japan*, Tokyo, October 1990, pp. 193-196.

Ogihara, M., Fujii, T., Aoyama, M., Ikegami, Y., "On Research of Two Dimensional Quadrupole Electrostatic Levitator," Mat. Sci. 16, 15-20 (1990).

Ogihara, M., Fujii, T., Aoyama, M., Ikegami, Y., and Kuribayashi, M., "Fundamental Research of Electrostatic Levitation Apparatus for Containerless Furnace," Ish. Har. Engr. Rev. 30, 329-334 (1990).

E. OTHER FOREIGN PROGRAMS

Electronic Materials

Bojun, Z., Xingru, Z., et al., "Gas As Single Crystal Growth from Melt in Space," Chinese J. Semicond. 9, 313 (1989).

Lanying, L., "Summary of GaAs Crystal Growth from Melt under Microgravity and Properties Investigation of the Space Grown Crystal," in *Proceedings of the First Chinese Symposium on Microgravity Science and Space Experiments*, Bejing, 1987.

Lanying, L. and Doaan, D., "Preparation and Properties of GaAs Single Crystal Growth from the Melt under Microgravity Conditions," Mat. Sci. Forum 50, 183-196 (1989).

Saghir, M.Z. and Rosenblat, S., "Numerical Simulation of Tetracosane and Cadmium Mercury Telluride in 1-g and 10^{-3}g Environment," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 75-88.

Sinan, J., Tiwen, F., et al., "Observation of Structure Defects in Te-Doped GaAs Single Crystal Grown in Space," Chinese J. Semicond. 10, 76 (1989).

Wang, Z.G., Li, C.J., et al., "A Study on Electrical and Optical Properties of GaAs Grown from the Melt under Microgravity Conditions," Chinese J. Semicond. 9, 313 (1989).

Wang, Z.G., et al., "Homogeneity and Deep Level Behaviours of the Space-Grown GaAs," Mat. Sci. Forum 50 (1989).

Wang, Z.G., Li, C.J., et al., "Electrical Characteristics of GaAs Grown from the Melt in a Reduced Gravity Environment," J. Appl. Phys. 67, 1521-1524 (1990).

Wang, Z.G., Li, C.J., et al., "Spatial Distribution of Impurities and Defects in Si-Doped GaAs Grown from Melt in a Reduced Gravity Environment," J. Cryst. Growth, in press.

Zhiwen, S., Lanying, L., "Single Heterostructure Light Emitting Diodes on the GaAs Single Crystal Substrate Grown in Space," in *Proceedings of the First Chinese Symposium on Microgravity Science and Space Experiments*, Bejing, 1987.

Zhiwen, S., Liping, L., and Lanying, L., "GaAs/AlGaAs DH Lasers on Si-GaAs Single Crystal Substrate Grown in Space," Chinese J. Semicond. 11, 795-798 (1990).

Fluids, Interfaces and Transport

Chakraborty, B.B., "Rayleigh-Taylor Instability with Mass and Heat Transfer under Microgravity Conditions," Int. J. Micro. Res. & Appl. 3(1), 8-12 (1990).

Cloot, A. and Lebon, G., "Surface Deformation Effect on Marangoni Convection in a Spherical Shell," Int. J. Micro. Res. & Appl. 3(1), 44-46 (1990).

Cloot, A. and Lebon, G., "Marangoni Instability in a Fluid Drop Cooled at its Surface, in a Microgravity Environment," Micro. Sci. & Tech. 3(2), 93-98 (1990).

Hu, W.R. and Tang, Z.M., "Thermocapillary Oscillatory Convection in Floating-Zone Simulation," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 279-284.

Inculet, I.I., Floryan, J.M., and Haywood, R., "Dynamic of Water Droplets Break-up in Electric Fields," in *Proceedings of IEEE-IAS Annual Conference*, Seattle, October 1990.

Inculet, I.I. and Floryan, J.M., "Experimental Investigations of Induced Polarization Effects in Water Droplets," Micro. Sci. & Tech. 3(3), 148-153 (1990).

Nghi, N-T., "On the Influence of Gravity on Nucleation Process in a Binary Liquid," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 447-450.

General Studies and Surveys

Boudreault, R., "Industrial Utilization of a Microgravity Environment," in *Proceedings of VII European Symposium on Materials and Fluid Sciences under Microgravity*, ESA SP-295, 1990, pp. 711-728.

1. Report No. NASA TM-4283	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Microgravity Science and Applications Bibliography – 1990 Revision		5. Report Date May 1991
		6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address Office of Space Science and Applications Microgravity Science and Applications Division		10. Work Unit No.
		11. Contract or Grant No.
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546		13. Type of Report and Period Covered Technical Memorandum
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

This edition of the Microgravity Science and Applications (MSA) Bibliography is a compilation of government reports, contractor reports, conference proceedings, and journal articles dealing with flight experiments utilizing a low-gravity environment to elucidate and control various processes, or with ground-based activities that provide supporting research. It encompasses literature published but not cited in the 1989 Revision and that literature which has been published in the past year.

Subdivisions of the Bibliography include: Electronic Materials; Metals, Alloys, and Composites; Fluids, Interfaces and Transport; Glasses and Ceramics; Biotechnology; Combustion Science; and Experimental Technology, Instrumentation and Facilities. Also included are a limited number of publications from the European, Soviet, and Japanese programs.

17. Key Words (Suggested by Author(s)) electronic materials protein crystal growth microgravity science and applications glasses and ceramics	18. Distribution Statement Unclassified-Unlimited

19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 83	22. Price A05